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SIGNIFICANT TRENDS IN HARD WHEAT BREEDING

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 2, Mar-Apr 86 pp 2-5

[Article by I. I. Vasilenko, candidate of agricultural sciences]

[Abstract] Extensive studies are currently being conducted in the USSR on the breeding of new varieties of hardy wheats as part of the Soviet Food Program. To date, 15 varieties of hardy spring wheat are being cultivated in the USSR. However, despite many biochemical, technological and high-yield advantages that they offer, they are also beset by their known susceptibility to a variety of fungal and other diseases. Current research efforts in breeding such varieties are intended to utilize to the maximum the available Soviet and foreign gene pools to breed new varieties suitable for the various climatic zones of the USSR. Such programs can only meet with success if there is unfettered cooperation among the research establishments and breeding stations. It is only on such foundations that the harvests anticipated by the Soviet Food Program can be met.

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FATTY ACID COMPOSITION AND ENERGY METABOLISM IN LIVER MITOCHONDRIA IN WHITE RATS INJECTED WITH ANTIOXIDANTS OF IONOL GROUP

Moscow BIOKHIMIYA in Russian Vol 50, No 10, Oct 85 (manuscript received 6 Aug 84) pp 1582-1586

[Article by I. V. Zhigacheva and Ye. Ya. Kaplan, Scientific Research Institute for the Biological Testing of Chemical Compounds, Kupavna, Moscow Oblast; work conducted at the Interdepartmental Scientific Research Laboratory of Molecular Biology and Bioorganic Chemistry imeni A. N. Belozerskiy, Moscow State University imeni M. V. Lomonsov and at the Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] A study was conducted on the changes in fatty acid content of liver mitochondrial membranes--changes which accompany the injection of ionol antioxidants in white rats--and on the relation of these changes to the activation or inhibition of NADH oxidation. Ionol, its lithium derivative and 4-hydroxy-3,5-ditertbutylphenyl-1-methylpropionylmethane were administered intraperitoneally at a dose of 50 mg/kg. Within 30 minutes of administration, the coupling of oxidation and phosphorylation was increased, while the rate of NADH oxidation via the pathway which is not sensitive to amytal or antimycin A decreased. Palmitic and stearic acid content was elevated, but oleic acid content was sharply depressed. The decrease in the ratio of unsaturated fatty acids to saturated reflects the increased viscosity of the mitochondrial membrane. At one hour, the rate of NADH oxidation by the external pathway had increased, as did the unsaturated fatty acid content. After three hours the measured parameters returned to their initial values, except that the NADH external oxidation pathway remained elevated. The antioxidants also caused a decrease in the amount of fatty acids containing eighteen carbon atoms. The results obtained confirm the correlation between the fatty acid content of mitochondrial membranes and their functional state. References 6: 5 Russian, 1 Western.

12126/12955
CSO: 1840/282

UDC 547.963.3+577.157.6

ISOLATION OF HpaI AND HpaII MODIFICATION-RESTRICTION ENZYMES

Moscow BIOKHIMIYA in Russian Vol 50, No 10, Oct 85
(manuscript received 28 Jan 85) pp 1659-1664

[Article by I. G. Bogdarina, V. Ye. Zinkevich, Ya. I. Buryanov and A. A. Bayev, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] A method was developed for isolating the four enzymes of the Haemophilus parainfluenzae HpaI-HpaII DNA restrictase-methylase system. The cell-free extract produced with ultrasound was fractionated using streptomycin sulfate, followed by ammonium sulfate. After dialysis, the methylases and restrictases were separated by chromatography on heparin-Sepharose. Further purification was accomplished using chromatography on DE52 for HpaI methylase, SP-Sephadex C25 for HpaI restrictase and P11-phospho-cellulose for HpaII restrictase and methylase. It was observed that methylated lambda phage DNA is hydrolyzed by HpaII restrictase but not by HpaI restrictase. HpaII methylase had pH independent activity in the 7.5-9 range, exhibited retarded activity in 50% glycerin and was able to methylate denatured DNA. The distribution of 5-methylcytosine in pBR322 DNA, methylated by HpaII, was independent of the degree of methylation. This indicates that the nearest neighbor nucleotide does not affect the activity of this enzyme. The higher activity of HpaII methylase makes it suitable for experiments which employ radioactively-labeled DNA and analysis of methylated residues. Figures 3; references 12: 3 Russian, 9 Western.

12126/12955
CSO: 1840/282

UDC 577.152

SITE SPECIFICITY OF DNA METHYLASES FROM SHIGELLA SONNEI 47 CELLS

Moscow BIOKHIMIYA in Russian Vol 50, No 10, Oct 85
(manuscript received 8 Feb 85) pp 1694-1701

[Article by N. G. Lopatina, S. V. Suchkov, S. M. Kulikov, I. I. Nikolskaya and S. S. Debov, Institute of Medical Enzymology, USSR Academy of Medical Sciences, Moscow]

[Abstract] The site specificity of the six DNA methylases from Shigella sonnei was studied using isoplith analysis, enzymatic treatment of isopliths and nearest neighbor analysis. The five cytosine methylases are designated $MC_{4.2}$, $MC_{5.3}$, $MC_{6.2}$, $MC_{7.4}$ and $MC_{8.4}$, corresponding to their pI's, while the single adenosine methylase is designated $MA_{9.5}$. Isoplith analysis showed that $MC_{5.3}$, $MC_{6.2}$, $MC_{7.4}$ and $MC_{8.5}$ can methylate C_2 dinucleotides and C_3 trinucleotides. $MC_{5.3}$ also methylates C_2T, while $MC_{6.2}$ and $MC_{7.4}$ methylate both CT and C_2T. $MC_{4.2}$ and $MC_{8.4}$ only methylate cytosine oligonucleotides. $MA_{9.5}$ is most active towards A_2G, A_2G_2 and AG_2. Treatment of the labeled methylation products with phosphomonoesterase, exonuclease or phosphodiesterase was used to determine the position of methylation. $MC_{4.2}$ was found to methylate the second residue from the 5' end of C_4. For $MC_{8.4}$ the site of action was the middle base of C_3 and the 3' end of C_2. Similarly, $MC_{5.3}$ methylated the middle base of C_3 and C_2T, and the 3' end of C_2. $MA_{9.5}$ methylated the middle base of A_2G when G was the 5' terminal. Computer analysis demonstrated that the $MC_{4.2}$ site is a nonsymmetrical tetracytosine sequence, which is modified at the second cytosine from the 5' end. The site of $MC_{8.4}$ is a nonsymmetric trinucleotide, with two cytosines and a cytosine or a purine on the 5' end. The middle base is the one which is methylated. $MC_{5.3}$ recognizes a symmetrical pentanucleotide with two cytosines following any nucleotide and two guanines at the 3' end. Similarly for $MC_{6.2}$ and $MC_{7.4}$, a pentanucleotide site, with a pyrimidine at the 5' end, followed by cytosine, any nucleotide, guanine and a purine, is proposed. The $MA_{9.5}$ site appears to be a hexanucleotide, with a 5'-guanine followed by two adenines, two thymines and a cytosine. References 13: 4 Russian, 9 Western.

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CSO: 1840/282

UDC 577.152.344.1

EXTRACELLULAR SERINE PROTEINASES OF BACILLUS THURINGIENSIS SUBSPECIES EVOLUTION MUCH SLOWER THAN CORRESPONDING DELTA-ENDOTOXINS

Moscow BIOKHIMIYA in Russian Vol 50, No 10, Oct 85
(manuscript received 26 Feb 85) pp 1724-1732

[Article by G. G. Chestukhina, O. P. Zagnitko, L. P. Revina, F. S. Klepikova and V. M. Stepanov, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] The previously demonstrated variability in the delta-endotoxins of B. thuringiensis subspecies led to an investigation of the degree of heterogeneity of the extracellular, thiol-dependent serine proteinases secreted by the israelensis and finitimus subspecies, and comparison with the previously-characterized enzyme of the galleriae subspecies. Maximum proteinase secretion of 0.03 mg/ml was observed at 11 hours of sporulation for the israelensis subspecies, while the finitimus had a maximum output of 0.01 mg/ml at 13 hours. Proteinase purification was based on affinity chromatography with bacillikhin-silichrome and bacitracin-Sepharose. The finitimus enzyme gave one electrophoretic band, with mobility identical to that of the major band of the galleriae proteinase. This band was a minor component of the israelensis enzyme, whose major band had greater mobility. The molecular weight of all three enzymes was 29,000 D and all had a pH maximum near 8.5. All were completely inhibited by di-isopropylfluoro-phosphate and phenylmethylsulfonyl fluoride. The specific activity towards benzyloxycarbonly-L-alanyl-L-alanyl-L-leucine p-nitro-anilide was an order of magniture greater for israelensis and galleriae than for finitimus. The israelensis enzyme had a temperature maximum of 45°, the galleriae 40° and the finitimus 35°. The israelensis enzyme was more stable at 60°. Amino acid compositions were very similar except that galleriae has less lysine. When the C-terminal fragment produced with cyanogen bromide was sequenced, 73% homology with the T. vulgaris serine proteinase was found. The N-terminal sequence of the israelensis enzyme had lysine in the 9-position, while finitimus and galleriae had asparagine. The data indicate that the thiol-dependent serine proteinases of the three subspecies are very similar but not identical. The evolution of the enzyme is slower than that of the endotoxin because the endotoxin gene is extrachromosomal, while the enzyme gene is not. Figures 5; references 21: 6 Russian, 15 Western.

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CSO: 1840/282

UDC 577.352.4

PERMEABILITY OF HUMAN ERYTHROCYTES TO ASPARAGINE

Moscow BIOKHIMIYA in Russian Vol 50, No 10, Oct 85
(manuscript received 28 Feb 85) pp 1733-1737

[Article by F. I. Ataullakhanov, V. M. Vitvitskiy, A. M. Zhabotinskiy and A. V. Pichugin, Scientific Research Institute for the Biological Testing of Chemical Compounds, Kupavna, Moscow Oblast]

[Abstract] The ability of asparagine to enter native human erythrocytes and erythrocytes loaded with asparaginase by reverse osmotic lysis was studied. Enzymatic methods of analysis demonstrated that asparagine accumulated in human erythrocytes at 0.1-0.2 mmole/hour·liter of cells, increasing linearly with asparagine concentration in the incubation medium, from 0.18 mM to 3.54 mM. This behavior can be described by a Michaelis-Menton equation with a K_m of 2.50 mM and a V of 0.24 mmol/hour·liter. Erythrocytes loaded with E. coli asparaginase accumulated aspartic acid rather than asparagine. The results demonstrate the marked permeability of native human erythrocyte membrane to asparagine, via a transport system. The rate of accumulation of aspartic acid in the loaded cells corresponded to the rate of asparagine transport. Figures 4; references 9 (Western).

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UDC 577.152.277/012.8

FRACTIONATION AND PURIFICATION OF SHIGELLA SONNEI 47 DNA-METHYLASES

Moscow BIOKHIMIYA in Russian Vol 50, No 11, Nov 85
(manuscript received 25 Dec 84) pp 1797-1804

[Article by S. V. Suchkov, I. I. Nikolskaya and S. S. Debov, Scientific Research Institute of Medical Enzymology, USSR Academy of Medical Sciences, Moscow]

[Abstract] The use of chromatography and isoelectric focusing for fractionation, isolation and purification of the individual DNA-methylases of Shigella sonnei was investigated. Chromatographing the total protein fraction obtained from S. sonnei 47 on a Biogel A0.5M gel-filtration column resulted in eight peaks of adenine or cytosine methylation activity. This suggests multimer formation, aggregation during purification, or both. Cation exchange chromatography on CM-cellulose SM-52 gave one heterogeneous fraction, while chromatograhpy on the stronger phosphocellulose R11 gave three discrete fractions, all containing a mixture of adenine and cytosine methylases. The increase in specific activity observed after cation exchange chromatography is probably due to the removal of inhibitory factors. Affinity chromatography on heparin-sepharose gave two peaks, the second of which was clearly heterogeneous. The first fraction contained the adenosine methylase and the second the cytosine methylase. Isoelectric focusing on a glycerin gradient was conducted using the pooled enzyme fractions from the phosphocellulose chromatography, after ammonium sulfate precipitation and dialysis. Six discrete fractions were obtained. The fraction with the highest pI, 9.5, was adenine methylase, while the others were all cytosine methylases. The results indicate that isoelectric focusing is superior to chromatography for purifying the six DNA-methylases of Shigella sonnei. Figures 5; references 29: 11 Russian, 18 Western.

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CSO: 1840/283

UDC 577.125

LIPID COMPOSITION OF LUMINESCENT CELL-FREE EXTRACT FROM LUMINESCENT BACTERIA

Moscow BIOKHIMIYA in Russian Vol 50, No 11, Nov 85
(manuscript received 25 Jan 85) pp 1811-1816

[Article by G. S. Kalacheva, Ye. S. Vysotskiy and V. V. Mezhevikin, Institute of Biophysics, Siberian Department, USSR Academy of Sciences Krasnoyarsk]

[Abstract] A study was conducted on the identification of the lipid components of a luminescent cell-free extract obtained from Photobacterium leiognathi. Thin layer chromatography (TLC) on silica gel revealed nine classes of lipids. The main phospholipid found in both cell-free and whole bacteria extracts was phosphatidylethanolamine and the compositions of the phospholipid and fatty acid fractions of the cell-free extract were similar to that of the intact cells. Waxes from the cell-free extract contained only palmitic and palmitooleic acids. The enzymes necessary for wax synthesis may also participate in the formation of aldehydes for the luminescence reaction. Three of the TLC lipid fractions gave a colored product with 2,4-dinitrophenylhydrazine, indicating the presence of carbonyl groups. However, only one of the three could serve as a substrate for luciferase. This fraction had the same TLC R_f as myristic aldehyde, but gas chromatography of dimethylacetal derivatives indicated that the substrate fraction contained two main components, neither one of which had the same retention characteristics as myristic, lauric or decyl aldehyde. The substrate aldehydes appear to contain 16 or 18 carbon atoms. Figures 6; references 25: 8 Russian, 17 Western.

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UDC 577.152

EFFECT OF BACTERIAL TOXINS ON GTPASE ACTIVITY OF TRANSDUCIN FROM OUTER SEGMENTS OF BOVINE RETINAL RODS

Moscow BIOKHIMIYA in Russian Vol 50, No 11, Nov 85
(manuscript received 5 Feb 85) pp 1825-1835

[Article by V. O. Rybin and A. A. Gureyeva, Institute of Experimental Cardiology, All-Union Cardiological Research Center, USSR Academy of Medical Sciences; Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study was conducted on the effects of cholera and pertussis toxins on the GTPase activity of homogeneous transducin and of the transducin in native outer segments of bovine retinal rods. Pertussis toxin was found to inhibit the GTPase activity of rod outer segments, with maximum inhibition of 30%-40% at 80 minutes of 37° incubation. Purified transducin was 70%-80% inhibited by pertussis toxin, with maximum inhibition at 60 minutes. This inhibition is due to the ADP-ribosylating activity of the toxin. Cholera toxin gave a maximum of 34%-37% inhibition after 60 minutes incubation with rod segments. The effects of both toxins were NAD-dependent. Cholera toxin had no effect on purified transducin. The results indicate that the two toxins react with different sites on the transducin complex. The GDP analogue Gpp(NH)p did not affect pertussis toxin rod segment inhibition, while GDPbetaS stimulated it. Gpp(NH)p suppressed pertussis toxin inhibition in purified transducin, but stimulated cholera toxin inhibition in rod segments. GDPbetaS attenuated toxin inhibition in rod segments. The data indicate that purified transducin is a better substrate for pertussis toxin that that found in rod segments. Results with nucleotide analogues demonstrate that both free transducin and its complex with GDP are pertussis toxin substrates, but not the complex with GTP. Transducin in both dark and light rods is affected by pertussis toxin. In contrast, transducin-GTP complex is the best substrate for cholera toxin, while the GDP complex is not suitable. The cholera toxin appears to affect catalytic activity but not affinity. Pertussis toxin may retard the formation of the transducin-GTP complex. Figures 6; references 33 (Western).

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UDC 577.125.8

GANGLIOSIDE GD_3 IN SERUM OF TUMOR HOSTS

Moscow BIOKHIMIYA in Russian Vol 50, No 11, Nov 85
(manuscript received 19 Jun 85) pp 1933-1935

[Article by E. V. Dyatlovitskaya, O. G. Somova, A. M. Novikov, Ye. N. Sorokin, L. S. Bassalyk and L. D. Bergelson, Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow; All-Union Oncological Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] The presence of the gangliosides $(NeuAc)_2LacCer$, NeuAcLacCer and $NeuAcGgOse_4Cer$ in the serum of cancer patients was studied. The gangliosides were isolated from serum by extraction with a chloroform-methanol mixture and subsequent purification on Sephadex G-50. Measurement of the gangliosides was conducted by thin layer chromatography, double immunodiffusion and reaction of the specific antibody-antigen complex with antibody to rabbit immunoglobulin which was labeled with peroxidase. Four normal serum samples, 12 sera from patients with lymphogranulomatosis, four from patients with intestinal carcinoma and four from patients with testicular cancer were tested. All normal sera contained NeuAcLacCer and $NeuAcGgOse_4Cer$, but not $(NeuAc)_2$ LacCer. Sixteen of the 20 cancer samples contained $(NeuAc)_2LacCer$. The data indicate that the $(NeuAc)_2LacCer$ ganglioside is present in most malignant tumors. References 13: 3 Russian, 10 Western.

12126/12955
CSO: 1840/283

GENETIC ENGINEERING METHODS IN AGRICULTURE

Moscow SELSKAYA ZHIZN in Russian 20 Apr 86 p 2

[Article by G. Muromtsev, Academician, All-Union Agricultural Academy, Director, All-Union Scientific Research Institute of Applied Molecular Biology and Genetics]

[Abstract] The significance of genetic engineering for modern agriculture is emphasized. The necessary minimum theoretical foundation for the development of genetic engineering in agriculture has been created, the first experiments on transfer of foreign genes to plants are completed. The institutes of the Soviet Union are now providing for agricultural selection centers, the first thousands of experimentally created plants which have not previously existed in nature. New varieties of barley, named "Istok" and "Odesskiy 115" have been created at the All-Union Genetic Selection Institute. Another important trend in agriculture biotechnology is chemical regulation of plant growth and development. Chemical regulators can be used to accelerate or slow the maturation of plants, making maturation simultaneous and increasing resistance to unfavorable environmental conditions. Retardants have been most widely used in the USSR and Europe. Institutes have developed and introduced to practice effective biostimulators for animal husbandry as well. The All-Union Scientific Research Institute of Applied Molecular Biology and Genetics has developed methods using these substances to control the reproductive process in cattle.

6508/12955
CSO: 1840/1182

MEDICAL APPLICATIONS OF CELLULAR ENGINEERING

Moscow PRAVDA in Russian 28 Apr 86 p 7

[Article by N. Mishina]

[Abstract] The Scientific Research Institute of Biomedical Technology, USSR Ministry of Health, is developing new means for diagnosis and treatment based on cell engineering. The Cosmonaut Boris Borisovich Yegorov, after writing his doctorate dissertation on the control of human status in space flight, now works over a microscope as the head of the Scientific Research Institute of Biomedical Technology, studying the human cell as a source of bioorganic compounds. The young scientists working at the Institute are so enthusiastic that they frequently do not go home at quitting time. The work of the Institute is discussed in very general terms and no new results are described. A cartoon hints that "biological robots" constructed by cell engineering techniques will be able to assist in the process of providing annual physical examinations for all Soviet citizens.

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CSO: 1840/1180

UDC 613.167.4:613.647

SETTING HYGIENIC LIMITS FOR INTERMITTENT PULSES OF ULTRAHIGH (2750 MHz) ELECTROMAGNETIC ENERGY IN ENVIRONMENT

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 10 Sep 84) pp 26-29

[Article by M. G. Shandala, Yu. D. Dumanskiy, L. A. Tomashevakaya and V. N. Soldatchenkov, Kiev Scientific Research Institute of General and Communal Hygiene imeni A. N. Marzeyev]

[Abstract] Outbred male and female rats were employed in a study to assess the physiological effects of exposure to intermittent pulses (400 Hz) of ultrahigh electromagnetic energy (2750 MHz). A variety of biochemical, immunological, electrophysiological and reproductive factors were assessed following exposure to power flux densities of 100-25,000 $\mu W/cm^2$ for 16 h/day for up to 4 months. Following the experiment those factors that did not vary to a statistically significant degree from control values were subjected to regression analysis. On the basis of such analyses a power flux density of 50 $\mu W/cm^2$ was determined to be without any biological effect, indicating that it represents the maximum safe limit for intermittent pulses of 2750 MHz electromagnetic energy. In view of the demonstrated fact that in some cases children are 3- to 4-fold as susceptible to environmental factors as adults, a maximum permissible limit of 15 $\mu W/cm^2$ has been approved by the USSR Ministry of Health.

12172/12955
CSO: 1840/2177

UDC 614.3+614.77]:579.842.11]-078

SCIENTIFIC BASIS FOR CONTROLLING SPREAD OF PATHOGENIC ESCHERICHIA IN HUMAN POPULATION AND ENVIRONMENT

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 24 Sep 84) pp 48-50

[Article by A. M. Kasyanenko, L. V. Grigoryeva, T. V. Bey, V. I. Bondarenko and G. G. Popovich, Kiev Scientific Research Institute of General and Communal Hygiene imeni A. N. Marzeyev; Kiev Scientific Research Institute of Epidemiology and Infectious Diseases imeni L. V. Gromashevskiy]

[Abstract] An epidemiologic study was conducted on the spread and occurrence of pathogenic Escherichia in 7 oblasts in the Ukraine over the 1976-1984 period, in order to provide a basis for control and prevention of escherichial diseases. Serological analysis of the isolated strains demonstrated that among the human isolates the following predominated: 0111 (21.9%), 0119 (10.6%), 0.26 (9.6%), 0.55 (9.5%), 124 (7.4%), 0151 (7.1%) and 0.25 (7%). The predominant strains obtained from various farm animals included 078 (9%), 0.15 (8.3%), 026 (5%), 0.2 (5.4%) and 0111 (3.4%). Finally, the 9 predominant serogroups isolated from various environmental sources included 0124 (12.9%), 0151 (11.2%), 0.25 (10.8%), 0111 (9.1%), 055 (7.1%) and 0.26 (5.9%). Determinations of pathogenicity of the various isolates showed that such characteristics correlated with serotype (usually isolated from patients) and such isolates were capable of invading Vero and Hep-2 cells. References 7: 6 Russian, 1 Western.

12172/12955
CSO: 1840/2177

UDC 612.65/.66-063]:614.7

ENVIRONMENTAL POLLUTION AND HUMAN DEVELOPMENT

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 31 Jan 85) pp 60-62

[Article by Yu. A. Antropov, Penza Institute for the Advanced Training of Physicians]

[Abstract] Accelerated human development, particularly in the urban areas, is related to environmental pollution and the biostimulatory effects of low concentrations of mutagens. The lag in the rural area vis-a-vis urban areas is attributed to the relatively lower level of environmental pollution. Data on accelerated physical development are correlated with the onset of industrialization for England, Norway, France, Sweden, Denmark, Germany, Holland, Finland and Russia. Comparative analysis for undeveloped and less or underdeveloped areas provides further support for the stimulatory theory, since in those areas a similar spurt in human physical development has not occurred or is evident on a much smaller scale. With a further increase in the pollution level adverse effects on human development can be anticipated due to a further increase in the mutagenic potential of food, air and water. Evidence is sited of decrease in the rate of growth and development in the USA, England and Sweden. Figures 4; tables 2; references 24: 15 Russian, 9 Western.

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UDC 597.08.591.6

PRINCIPAL FEATURES OF ECOSYSTEM TRANSFORMATION OF AZOV SEA IN CONNECTION WITH DEVELOPMENT OF NATIONAL ECONOMY IN ITS BASIN

Moscow VOPROSY IKHTIOLOGII in Russian Vol 26, No 1, Jan-Feb 86
(manuscript received 22 Dec 82) pp 33-47

[Article by S. P. Volovik, Azov Scientific Research Institute of Fisheries, Rostov-na-Donu]

[Abstract] This review article analyzes changes in the Azov Sea ecosystem during the past three decades in relationship to the development of its productivity. The Azov Sea basin is heavily populated. Because of arid climate, intensive river regulation was introduced and maintained. Anthropogenic changes in the profile of Azov Sea are seasonal and relate to water flow and resulting change in its salinity. During the three decades, fish resources were depleted, sedimentation affected the sea bottom, salt levels changed affecting fish migrations, their abundance and productivity of phytoplankton. Some of these changes were predicted by many scientists long ago. The process could be reversed to recover the productivity and economic potential of the Azov Sea. Figures 3; references 72 (Russian).

7813/12955
CSO: 1840/2241

UDC 614.31+613.281]:639.2:546.226'173]-074

NITROSO COMPOUND CONCENTRATION IN FISH IN CENTRAL OB RIVER REGION

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 8 Oct 84) pp 70-71

[Article by V. G. Bychkov, G. F. Zhukova and V. V. Pimenova, Tyumen Medical Institute, RSFSR Ministry of Health; Institute of Nutrition, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study was conducted on the concentration of nitroso compounds in fish caught in the Ob and Irtysh rivers in the vicinity of Khanty-Mansiysk in Tyumen Oblast. The studies were conducted on fresh, salted and smoked tissues of id (Leuciscus idus) and roach (Rutilus rutilus); all specimens were infested with metacercaria of Opisthorchis felineus. Gas chromatography resulted in the identification of only two nitroso compounds -- N-diethylnitrosamine and N-dimetnylnitrosamine -- which were present in the range of 0.2 to 6.8 μg/kg. The concentration of the nitroso compounds was much higher in the Ob river fish than in fish caught in the Irtysh, with the highest levels in both cases detected in smoked fish. The public health authorities will have to be alert to these findings since even low concentrations of nitroso compounds predispose humans infected with opisthorchis to hepatic neoplasia. References 6: 4 Russian, 2 Western.

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CSO: 1840/2178

UDC 614.7:615.277.4].001.33

HYGIENIC CLASSIFICATION OF CARCINOGENS AND ITS USE IN LIMITING EXPOSURE TO CARCINOGENS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 31 Jan 85) pp 10-13

[Article by N. N. Litvinov, Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow]

[Abstract] A classification scheme is proposed for carcinogens and cocarcinogens on the basis of which an environmental situation can be assessed as to health risk. In dealing with chemical pollutants affecting air, water and food products, they are classified into Class I carcinogens that are ubiquitous and Class II carcinogens that are present sporadically. Class I encompasses such common entities as asbestos, benz(a)pyrene, DDT, formaldehyde and other common chemicals and biological products such as the aflatoxins, while Class II consists of carbon tetrachloride, a variety of pesticides, nitroso compounds, agricultural growth stimulants (including hormones), beryllium and its compounds, etc. The presence of a carcinogen from either category or a combination from one or both classes results in an assessment of a given environment as dangerous, highly dangerous or extremely dangerous. Provisions are also made for the presence of cocarcinogens, and the latter are also rated as Class I or II on the basis of potency. Sanitary measures should aim at reducing the concentration of a given carcinogen in a given environment to the permissible exposure levels. References 12: 9 Russian, 3 Western.

12172/12955
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CURRENT STATUS AND TRENDS IN RESEARCH ON ENVIRONMENTAL CHEMICAL CARCINOGENS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 24 Dec 84) pp 7-10

[Article by M. G. Shandala, N. Ya. Yanysheva, I. S. Kireyeva and I. A. Chernichenko, Kiev Scientific Research Institute of General and Communal Hygiene imeni A. N. Marzeyev]

[Abstract] A brief summary is presented of some of the concerns and research at the Kiev Scientific Research Institute of General and Communal Hygiene on chemical carcinogens that are responsible for pollution. The current efforts involve monitoring and assessing the health risk from such pollution in the Ukraine, in particular as they deal with polycyclic aromatic hydrocarbons and nitrosamines. It has been estimated that by 1990 the incidence of lung cancer among males in Ukraine will increase 1.83-fold, and among women by 1.69-fold. In conjunction with monitoring programs, the Institute is also concerned with establishing time-averaged permissible exposure levels, based on actual evaluations of exposure and relative risks of the various chemical carcinogens. Other efforts deal with setting and promoting preventive measures and standards for the chemical industry, and in the identification and control of other actual or potential carcinogens in the environment. The philosophy which underlies all of the Institute's efforts and research is that prevention is better than treatment. References 19: 18 Russian, 1 Western.

12172/12955
CSO: 1840/2178

UDC 616.936-022.1:576.893.192.6.097.21

POSSIBLE SIGNIFICANCE OF OPTIMAL INFECTING DOSE IN MALARIAL PATHOGEN-CARRIER SYSTEM

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 5 Dec 84) pp 10-17

[Article by A. N. Alekseyev, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow]

[Abstract] Based on previously reported observations that in other pathogen-vector systems (e.g., Yersinia pestis-Xenopsylla cheopsis, Leishmania major-Phlebotomus papatasi) an optimal infecting dose leads to optimal or enhanced infectivity of the carrier for the vertebrate target, a study was conducted to determine whether a similar relationship prevails in the malarial pathogen-mosquito carrier system. Using blood meal techniques involving feeding through a biomembrane resulted in the demonstration that oocyst formation was definitely dependent on the micro- and macrogametocyte dose ingested in the case of mutually adapted systems, e.g., Aedes aegypti and Plasmodium gallinaceum, and Anopheles stephensi and P. inui. Above the optimal concentration of gametes, oocyst formation and infectivity of the mosquitoes decreased. However, in the case of 'unadapted' systems, e.g., An. quadrimaculatus and P. gallinaceum, oocyst formation (and, hence, infectivity) was directly in relation to the concentration of the gametes in the blood meal. These observations indicate that the biomembrane methodology may be useful in screening for mosquito-plasmodium compatability or mutual adaptation, and in predicting the persistence in a region of imported plasmodial varieties. Furthermore, these observations also point to the need to use gametocidal agents in immune populations for the control of malaria. Figures 6; references 18: 8 Russian, 10 Western.

12172/12955
CSO: 1840/2255

UDC 616.98.578.833.11]-022.9:597.8

LAKE FROG (RANA RIDIBUNDA) MAINTENANCE HOST FOR SANGUIVOROUS MOSQUITOES IN TAJIKISTAN AS RESERVOIR OF WEST NILE VIRUS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 13 Nov 84) pp 49-50

[Article by M. A. Kostyukov, Z. Ye. Gordeyeva, V. P. Bulychev, N. V. Nemova, O. A. Daniyarov and T. M. Tukhtayev, Tajik Scientific Research Institute of Epidemiology and Hygiene, Tajik SSR Ministry of Health, Dushanbe]

[Abstract] Studies were conducted with lake frogs (Rana ridibunda) captured in Tajikistan, known to serve as a maintenance host for a variety of blood-sucking mosquitoes (Aedes c. caspius, Culex pipiens, Anopheles hydrcanus, Culiseta annulata subochrea, Culex modestus), to determine whether they can function as a reservoir for the West Nile virus. Experimentally infected frogs were maintained at 19 or 24°C and assayed for the presence of virus on a time scale. Following subcutaneous infection, the virus was isolated from the blood as late as 7 days from animals kept at 19°C, and from the internal organs and the brain as late as 12 days later. Isolates were obtained from the 24°C animals as late as 17 days from the internal organs and 61 days from the blood. In addition, in the latter group of frogs, the virus titers were much higher. The titers of the virus in the blood of the frogs was sufficiently high for infection of the mosquitoes, suggesting that Rana ridibunda may serve as a natural host for the West Nile virus. References 6: 4 Russian, 2 Western.

12172/12955
CSO: 1840/2255

UDC 578.833.28:578.224]:576.895.771.095.38

SYNTHESIS OF WEST NILE VIRUS PROTEINS IN MOSQUITO AND MAMMALIAN CELLS IN RELATION TO INFECTIOUS PROCESS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 11 Oct 84) pp 50-54

[Article by V. N. Lyapustin, S. P. Chunikhin, T. S. Gritsun, I. A. Reshetnikov and V. A. Lashkevich, Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow]

[Abstract] Comparative studies were conducted on West Nile virus protein synthesis in cultures of Aedes albopictus and embryonic pig kidney cells, and related to the histologic outcome of the cells following infection. Polyacrylamide gel electrophoretic patterns demonstrated that in the porcine cells the following viral protein were produced as a result of infection: p13, p18, p70 and p97. The same proteins and two additional components -- p27 and p45 -- were synthesized in the mosquito cells. The p13 and p18 fractions synthesized in the mosquito cells represented slower components than the analogous components in the mammalian cells, while p70 and p97 were equivalent in mobility for both types of cells. Synthesis of the viral proteins in the mosquito cells proceeded without affecting the synthesis of mosquito proteins, while in the mammalian system most of the mammalian system most of the mammalian proteins were sharply inhibited. This difference would appear to account for the marked cytopathic effect of the infection in the mammalian cells, and the lack of such an effect in the mosquito cells. Figures 2; references 10: 2 Russian, 8 Western.

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CSO: 1840/2255

UDC 616.936-036.2-037(477)

HISTORY AND CURRENT STATUS OF PREDICTIVE STUDIES ON MALARIA, ITS VECTORS AND OTHER SANGUIVOROUS DIPTEROUS INSECTS IN AREAS WITH EXISTING AND UNDER-CONSTRUCTION WATERWORKS IN UKRAINE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 9 Sep 83) pp 62-68

[Article by A. K. Shevchenko and A. P. Popovich, Zaporozhye Medical Institute]

[Abstract] In order to assess the health consequences of the extensive waterworks in Ukraine--a much neglected area of research--the effects of such constructions were analyzed in terms of malarial vectors and other dipterous insects. Particular emphasis was put on reservoirs located in the steppe and forest-steppe zones of Ukraine proper, and on the irrigation canals in the Crimean steppe. The data showed that, in general, the insect density fell sharply for the first 2-3 years after the filling of a new reservoir. After 3 years the insect density began to increase in the upstream locations. The ecologic effects of the reservoirs and canals were such as to require 2 to 3 decades or more for a new insect balance to become established. Consequently, there has to be constant long-term monitoring of the changing composition of sanguivorous insects populations to assess health risks, such as malaria, in areas with waterworks. In some cases shallow-water areas formed upstream to a reservoir were found to be twice as great as predicted, leading to ideal conditions for the reproduction of mosquitoes (Anopheles, Culex, Aedes). References 42 (Russian).

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UDC 616.995.132.77-036.21

HOUSING FLEA DENSITY IN ENDEMIC PLAGUE AREAS IN ARAL SEA REGION

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 25 May 84) pp 68-70

[Article by L. A. Burdelov, I. Zh. Zhubanazarov, Ye. P. Kartushin, V. Ye. Filipchenko, N. F. Rudenchik and V. K. Sintsov, Central Asian Scientific Antiplague Institute, USSR Ministry of Health, Alma Ata; Aral Sea Region Antiplague Station, USSR Ministry of Health, Aralsk]

[Abstract] A study was conducted on the density of fleas in dwellings in the Aral Sea region, spanning a period of some 20 years (1964-1983) and involving identification and enumeration of 10,000 fleas belonging to 9 species. The analysis for the different areas in the regions showed that 99% of the specimens were Pulex irritans. The highest incidence of P. irritans was recorded in the Karakums in 1966 (3.3 fleas/100 m^2 floor area) and in 1970-1974 (2.9-7.3 fleas/100 m^2). By 1977 the density had fallen markedly, and has not exceeded 0.7 fleas/100 m^2 since then. A generally similar pattern prevails in the other areas, with no evidence of synchronous fluctuations in the densities reported for the various areas. The pattern of a constant decrease in the flea density in dwellings is attributable to the improvements in the sanitary conditions and wellbeing of the residents in those regions. The relatively infrequent encounter of other species with predilection for cats, dogs, and wild mammals was presumably due to their breeding habits (warehouses and basements), although massive invasion of human dwelling is possible in small settlements. References 8 (Russian).

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CSO: 1840/2255

UDC 616.936.1-022:375-036.2-07:616.89-008.441.13-078(597.7)

RISK FACTORS FOR MALIGNANT TERTIAN MALARIA IN VIETNAM. PART 1. CLINICAL LABORATORY CHARACTERISTICS OF NARCOTIC ADDICTS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 3 Feb 84) pp 70-73

[Article by A. M. Shcherbakov, N. N. Ozeretskovskaya, Chin Kim An, Vu Tkhi Fan, S. A. Rabinovich, Nguen Tkhi Ny May, Nguen Khu Dyk, Doan Tkhi Khan, Le Nguen Bin, Vu Tkhi Tuet and A. A. Lurye, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow; Institute of Malariology, Parasitology and Entomology, Hanoi, and Chorei Hospital, Ho Chi Minh City, Vietnam]

[Abstract] Comparative laboratory data were collected and analyzed for 43 narcotic addicts in Ho Chi Minh City and 24 healthy blood donors in Hanoi, in order to relate the laboratory findings to susceptibility to tertian malaria. In the former group, 61.9% of the 21 subjects so tested were positive for infestation with various intestinal helminths, whereas none of the 13 control subjects similarly examined were positive. Thick blood smears revealed the presence of P. falciparum in 9 of the 43 addicts; however, the subjects were free of any clinical manifestations of malaria. In addition, in 18 of 34 addicts so tested -- who were not P. falciparum carriers -- antibodies against the parasite were present. None of the subjects in the control group had antibodies or parasites. Clinical chemistries demonstrated that in addicts there were statistically significant elevations in blood levels of gamma-globulins, fibrinogen, and circulating immune complexes. These various factors may be related to the particularly severe course of tertian malaria in narcotic addicts. References 12: 2 Russian, 1 Czech, 9 Western.

12172/12955
CSO: 1840/2255

UDC 576.895.2.08(437)(048.8)

SUMMARY OF RESEARCH RESULTS IN CZECHOSLOVAKIA ON ARTHROPOD DISEASE VECTORS (LITERATURE SURVEY)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 20 Jul 84) pp 78-82

[Article by V. Cerny, Institute of Parasitology, Czechoslovak Academy of Sciences, Ceske Budejovice]

[Abstract] Commencing with a historical survey of the status of medical arachnoentomology and the key investigators, this review centers on current studies and research results in Czechoslovakia. Initial efforts in the post-war period concentrated on data collection and identification of arthropods functioning as carriers, with subsequent studies dealing with host-parasite relationships, preventive measures, and their role in ecosystems. Some of the more important research efforts were based on expeditions conducted in the Balkans, in the alpine areas of Asia (Afghanistan, Pakistan, Nepal), and in Mongolia and Cuba. To date, the arthropod fauna involved in disease transmission is well known as far as Czechoslovakia is concerned, with future research emphasis to be placed on the interrelationships in the host-carrier-disease agent cycle. References 52: 1 Russian, 8 Slovak, 33 Czech, 10 Western.

12172/12955
CSO: 1840/2255

UDC 616.995.132.6-036.21(470.53)

FAMILIAL OUTBREAK OF TRICHINELLOSIS IN PERM OBLAST

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 15 Nov 83) pp 83-84

[Article by O. K. Myshkina and E. E. Eykhner, Chair of Infectious Diseases, Perm Medical Institute]

[Abstract] A familial outbreak of trichinellosis was noted in the village of Ryabki in Perm Oblast in November 1981, resulting from the consumption of a stew prepared from badger meat. The outbreak, involving 4 members of a family (mother, father, 2 children), had a moderately severe course in 3 members of the family and mild manifestations in the 4-year-old child. The clinical features of the disease were typical, with periorbital edema, muscle pains, fever, eosinophilia and skin rashes. Treatment was symptomatic and supportive with good results, and included the administration of Vermox. References 9 (Russian).

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UDC 576.895.771.01(575.14)

DETECTION OF MASS BREEDING SITE OF CULEX PIPIENS RESPONSIBLE FOR HUMAN ATTACKS AT ZIADIN STATION OF CENTRAL ASIAN RAILWAY: ELIMINATION OF BREEDING SITE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 16 Mar 84) pp 84-85

[Article by V. L. Kulanin, Railway Sanitary Epidemiologic Station, Samarkand Central Asian Railway Station]

[Abstract] Numerous complaints of insect bites at the Ziadin Station in the Uzbek SSR led to an investigation which identified the attacker as the mosquito Culex pipiens. The mosquitoes were found to breed extensively in a concrete-line waste water pit, a phenomenon favored by relatively slow water flow in 1983. Disinfection of the station and adjacent facilities with 2% chlorophos and sealing of the pit eliminated the attack problem within 4 days. References 9 (Russian).

12172/12955
CSO: 1840/2255

UDC 616.993.162-036.2(575.12)

URBAN-TYPE CUTANEOUS LEISHMANIASIS AFTER A LONG INTERMITTENT PERIOD IN ANDIZHAN

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 22 May 84) pp 86-87

[Article by V. F. Rozina, Sh. A. Khamidov and I. K. Karimova, Andizhan Medical Institute imeni M. I. Kalinin]

[Abstract] The first case of cutaneous leishmaniasis was reported in Andizhan after a 20 year intermittent period. The patient was a boy born in 1969 who presented with typical symptomatology in the 5th month of illness. A cure was finally obtained after 11 months which included 96 hospitalization days. Histological confirmation for the disease was obtained by slide examination at the Institute of Medical Parasitology and Tropical Medicine in Moscow. The occurrence of an 'urban-type' cutaneous leishmaniasis was attributed to slackening entomological control measures, leading to a rise in the sandfly population. Figures 1; references 2 (Russian).

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UDC 576.895.77.01(470.51)

BLACKFLY (DIPTERA, SIMULIIDAE) ATTACK RATE ON HUMANS IN UDMURT ASSR

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 31 Jan 84) pp 87-89

[Article by S. M. Mukanov, Chair of Histology, Izhevsk Medical Institute]

[Abstract] An analysis of the blackfly populations in the Nagorye Forest Preserve in Udmurt ASSR revealed that the predominant species were Simulium galeratum and S. morsitans longipalpe, with the density of the latter exceeding that of the former two-fold. Determinations of attack rates on human in a 5-min period showed that the highest incidence prevailed in July (38/5 min) and the lowest in August (2.7/5 min). It appears that seasonal work assignments in the forest should be carefully planned to avoid undue attacks by these sanquivorous insects. References 4 (Russian).

12172/12955
CSO: 1840/2255

UDC 616.9-036.21:061.3(47+57)"1984"

ELEVENTH ALL-UNION CONFERENCE IN TYUMEN ON NATURAL DISEASE FOCI

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85, pp 90-91

[Article by S. A. Beer and L. S. Yarotskiy]

[Abstract] The 11th All-Union Conference on Natural Disease Foci was held in Tyumen on September 18-20, 1984. The conference was organized by the appropriate organs from the USSR Academy of Sciences, the USSR Academy of Medical Sciences, the Tyumen Scientific Research Institute of Regional Infectious Pathology and the RSFSR Ministry of Health. The conference was attended by 200 specialists from across the USSR, and included a program of some 260 research communications and poster stands. The materials presented at the conference dealt with clinical and theoretical aspects of the basic problems to which this conference was devoted, as well as with administrative approaches to insuring greater cooperaiton among the various institutes. The 12th Conference has been scheduled for Novosibirsk in 1989.

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NATURAL FOCI OF INFLUENZA VIRUSES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 11 Oct 85) pp 27-30

[Article by D. K. Lvov and S. S. Yamnikova, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] A review is presented of current knowledge and theories regarding antigenic variability of human and animal influenza viruses, with data pointing to recombination events between them. Cursory discussion is given to the mechanisms of antigenic drift and shift, and the theoretical foundations for direct mutation and recombination in the type A virus. Evidence is presented from studies on Zhemchuzhnyy Island in the northern area of the Caspian Sea for the concomitant circulation of several recombinants in nature, and that such viruses can persist in water at 4°C for 6 or more months. A case analysis is presented on the isolation of a natural recombinant, A/H1N3, from a child in Azerbaijan in 1982, which was antigenically identical to a 1976 isolate from a whale in the Pacific Ocean. The isolation of the natural recombinant from a human source was the first demonstration of its kind of human infection with an animal influenza virus, and of recombination between human and animal influenza viruses. References 27: 17 Russian, 10 Western.

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CSO: 1840/2256

UDC 616.98:578.833.26]-022.913.233]-036.21-07

VARIABILITY LIMITS IN INTENSITY OF EPIDEMIOLOGIC MANIFESTATIONS OF NATURAL FOCI OF TICK-BORNE ENCEPHALITIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 10 Nov 85) pp 35-39

[Article by E. I. Korenberg, L. M. Ivanova and Ye. V. Yurkova, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences; Main Sanitary-Epidemiologic Administration. RSFSR Ministry of Health, Moscow]

[Abstract] In the USSR, 80-90% of the outbreaks of tick-borne encephalitis (TBE) occur in the RSFSR. In view of this, the intensity of epidemiologic outbreaks was analyzed for a 25 year period (1956-1980) in 24 of the affected administrative territories in the RSFSR in order to assess the range of incidence. The statistical data showed that, in the period in question, the difference between maximal and minimal morbidity statistics was rather small. In most of the cases the difference between these two figures was within the 2- to 4-fold range. In the entire 25 year period maximal values exceeded the minimal values not more than 9-14 times, and within a 10-year period (1971-1980) in selected administrative rayons not more than 11 times. These observations suggest a limit value for the intensity of epidemic events related to TBE, which depends on factor predisposing to the outbreak as well as fluctuations in the human population density. Figures 3; references 14: 13 Russian, 1 Western.

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UDC 616.993.162-036.2-07

NOSOGEOGRAPHIC CHARACTERISTICS OF LEISHMANIASIS IN OLD WORLD

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 2 Oct 85) pp 49-55

[Article by V. M. Neronov, S. M. Malkhazova and V. S. Tikunov, Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences, Moscow]

[Abstract] Multidimensional mathematical models were constructed to provide a cartographic presentation of the status of leishmaniasis in the Old World in relation to parasite species. On the basis of such consideration and in combination with data available in the literature, five focal areas were identified in the Old World, subdivided into 17 provinces and 3 autonomous regions. In terms of decreasing morbidity, the 5 areas were identified as Mediterranean, East African, West African, South Asia, and Sahara-pro-Asian. Within each area circulate apparently independent taxonomic groups of the parasitic agent, identified as L. tropica in the Mediterranean focus, L. aethiopica in the East African focus, L. major in the West African and South Asian foci, and L. major in the Sahara-pro-Asian focus. These preliminary observations suggest that the local vectors and geographical isolation are quite important in the formation of species and subspecies of leishmania. Figures 2; references 17: 12 Russian, 5 Western.

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CSO: 1840/2256

UDC 616.9-036.21-07(048.8)

LITERATURE REVIEW OF NATURAL DISEASE FOCI IN BAYKAL-AMUR RAILWAY REGION

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 25 Jun 85) pp 71-75

[Article by Yu. V. Kovalevskiy and E. I. Korenberg, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] A brief review is presented of the information published to date of the various natural disease foci in the territory covered by the Baykal-Amur Railway, which encompasses a region of 1.6 million square kilometers. Among the various foci identified, particularly serious are those pertaining to leptospirosis, pseudotuberculosis, salmonellosis, rickettsial diseases, ornithosis, rabies, tick-borne encephalitis, tularemia, and so forth. The highest health risk is encountered in the Komsomolsk-Amur, Urgal, and North Buryat industrial rayons, while the Tynda, Sovetsko-Gavanskiy, Tuguro-Chumikanskiy, South-Yakutsk, Udokanskiy, Verkhne-Lenskiy and Mamsko-Bodaybinskiy rayons are deemed to be the safest. The Nizhne-Amur, Selemdzhinskiy and Zeyskiy industrial rayon were determined to be in the intermediate category of health risk factors. However, with the exception of tick-borne encephalitis, the incidence of various infectious diseases along the length of the railway is relatively low. It appears that a greater health risk might come from infectious foci arising as a result of anthropogenic intrusion into these regions. References 42 (Russian).

12172/12955
CSO: 1840/2256

UDC 616.995.122.21-036.2(574.25-22)

OPISTHORCHOSIS IN RURAL AREAS OF PAVLODAR OBLAST

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 4 Feb 85) pp 76-77

[Article by L. A. Gorbunova, Yu. V. Teplukhin and Sh. S. Bisariyeva, Scientific Research Institute ot Epidemiology, Microbiology and Infectious Diseases, Kazakh SSR Ministry of Health, Alma Ata]

[Abstract] An analysis was conducted on the level of human infestation with opisthorchis in the village of Gryaznovak, Yermakovskiy Rayon, Pavlodar Oblast. Examination of 274 of the 1500 residents revealed that the general level of infestation with helminths was 9.8% (9.4% due to opisthorchis) in 1984. No cases were detected among children 5 years old and younger, followed by an incidence figure of 6.02 to 8.24% for the age bracket spanning 6 to 50 years. Above 50 the incidence was ca. 25%. The results showed that the level of infestation with opisthorchis was below that recorded in the fifties and sixties, but that the problem still persists and will require further efforts at elimination. References 4 (Russian).

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EFFECTIVENESS OF OPOKO DUST AGAINST FLEAS IN URAL-EMBEN INTERFLUVIAL PLAGUE REGION

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 8 Jul 85) pp 77-79

[Article by M. G. Protopopyan, A. N. Mironov, V. M. Volkov, Ye. G. Samarin and V. A. Vasilyev, Rostov-on-Don Antiplague Institute]

[Abstract] Practical trials were conducted in the ural-Emba interfluvial region endemic for plague on the effectiveness of "opoka" [sic] mineral dust in flea control. The insecticidal activity is attributed to damage to the water-repelling lipid epicuticle. Gerbil burrows were dusted in the period 1978-1981 in which the predominant (98%) flea species was Xenopsylla skrjabini. Dusting was found effective in reducing flea infestation by ca. 85% 4-6 days after dusting under the most favorable conditions, generally the dry summer season. Optimal dosage was represented by 3-3.5 kg of opoka per a colony of 3-6 gerbils. In view of the vast mineral deposits in the USSR and the ease with which the dust can be prepared and its high index of safety for man, it appears that trials are warranted in residential areas. References 8: 6 Russian, 2 Western.

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UDC 616.995.121-036.2-07

SANITARY AND HELMINTHOLOGICAL ASPECTS OF EPIDEMIOLOGIC STUDIES ON ECHINOCOCCOSIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 11 Mar 85) pp 79-80

[Article by N. A. Romanenko, V. B. Martynenko, T. A. Loseva and V. I. Suvorina, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow]

[Abstract] Prevention of echinococcosis is largely a matter of sanitation, but a fully effective preventive campaign requires a better appreciation of the epidemiologic process than is currently available. One of the factors that could be used in the assessment of human health risk is environmental contamination with oncospheres in a given endemic area, as well as determination of the prevalence of the definitive host(s) and intermediate hosts. Various helminthic indicators have been proposed as indirect evidence of echinococcosis in animals, such as the eggs of Toxocara canis and T. leonina since such eggs are known to be hardy when exposed to the environment. The presence of such an egg can be suggestive of concomitant contamination with oncospheres, with examination directed at objects subject to fecal contamination. Figures 1; references 9 (Russian).

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CSO: 1840/2256

UDC 616.995.132-036.2-07

GROUP INFECTION WITH TRICHINOSIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 21 Feb 85) pp 80-81

[Article by V. G. Gulko, Kurgan Municipal Sanitary Epidemiologic Station]

[Abstract] In the period of July 2-28, 1984 six people were affected with trichinosis in Khadyzhensk, Krasnodar Kray, as a result of ingestion of shashlik prepared from uninspected pork. Although the clinical symptomatology was typical (eosinophilia, severe muscle pains, fever, periorbital edema, etc.), diagnosis was delayed because of unfamiliarity of the attending physicians with the basic clinical manifestations. This incident points to the need for a high index of suspicion, particularly when some of the telling symptomatology is slow in appearing (e.g., myalgia, eyelid edema).

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UDC 616.995.132-036.21-084.4

SANITARY TACTICS IN MIXED FOCI OF ASCARIASIS, TRICHURIASIS AND ENTEROBIASIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 21 Feb 85) pp 81-83

[Article by R. E. Chobanov, Azerbaijan Scientific Research Institute of Parasitology and Tropical Medicine imeni S. M. Korov, Baku]

[Abstract] Five villages in Azerbaijan representing mixed foci of ascariasis, trichuriasis and enterobiasis were used to assess the effectiveness of a concerted effort at reducing the incidence of infestation. Mass dehelminthization was conducted at 2 to 2.5 month intervals (to overcome the prolonged incubation period of trichuriasis and enterobiasis), with the administration of Vermox b.i.d. for 3 days. This procedure was conducted in combination with efforts at a general improvement in the sanitary conditions in the villages, i.e., prevention of human fecal contamination, careful washing of garden products, etc. Re-examination of the population at each village after 1.5 to 2 years showed that the general level of infestation was reduced from ca. 20-56% to 0-11%. A combined approach to the elimination or control of the level of ascariasis, trichuriasis and enterobiasis in mixed foci was thus shown to be clinically effective and relatively inexpensive. Tables 2; references 7 (Russian).

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UDC 614.374]:616-084

URGENT TASKS IN HYGIENIC EDUCATION WITHIN FRAMEWORK OF COMPREHENSIVE PROGRAM FOR PREVENTIVE MEDICINE

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 15 Oct 84) pp 54-56

[Article by N. N. Malinskaya, A. V. Terman and R. Z. Pozdnyakova, Central Scientific Research Institute of Sanitary Education, USSR Ministry of Health, Moscow]

[Abstract] One of the most important problems facing the health community is that of public health education, particularly in reaching the school-age population. To that end effective efforts must be made in the recruitment of teachers in the health campaign. To date, however, such efforts have not been too successful in that, in many areas, appropriate instructions in that regard have been ignored to all intents and purposes. To encompass the Soviet population as a whole and to generate their interest in health promotion, it is necessary to understand mass and individual psychology. A special effort must be made by the health authorities to enlist the cooperation of government, party, trade union and administrative officials in promoting health education. Emphasis must be placed on the fact that individual health is the cornerstone of mature socialism and the wellbeing of the entire Soviet people. References 5: 4 Russian, 1 Western.

12172/12955
CSO: 1840/2177

UDC 614.777:579.841.11]-07

PSEUDOMONAS AERUGINOSA IN WATER. HYGIENE AND EPIDEMIOLOGY

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 10 Jul 85) pp 57-60

[Article by N. B. Komzolova and G. P. Kalina, Moscow Scientific Research Institute of Hygiene imeni F. F. Erisman]

[Abstract] Two aspects of the problem of studying Ps. aeruginosa in sewage are analyzed: the level of contamination of sewage and measures for reduction of this level. This survey of the literature is based on the following criteria. It is assumed that with optimal methodology 100% of sewage samples with a volume of 50-100 ml will be positive. The percentage of positive samples as an indication of effectiveness of a method is informative only when parallel studies of the same object are performed by two or more methods. Two methods cannot be compared using data from two different investigators. The data here presented, primarily form American studies, indicate a high level of Ps. aeruginosa contamination of sewage and swimming pool water. The resistance of Ps. aeruginosa to physical and chemical efforts at its extermination allow this microorganism to be used as an indicator of the effectiveness of purification and decontamination measures. Water from wells generally does not contain Ps. aeruginosa or is only moderately contaminated with it. However, cases have been encountered of serious disease resulting from contaminated well water. Ps. aeruginosa is an allochthonic microorganism which is quite common in the hydrosphere and of great hygienic significance as a pathogen and an indicator. References 64: 5 Russian, 59 Western.

6508/12955
CSO: 1840/2192

UDC 616.931:576.8-063:577.1

MICROBIOLOGICAL CHARACTERISTICS OF DIPHTHERIA CULTURES CIRCULATING IN AZERBAIJAN

Baku AZERBAYDZHANSKIY MEDITSINSKIY ZHURNAL in Russian No 2, Feb 86 pp 29-33

[Article by D. Ya. Kasimova, Azerbaijan Order of the Red Banner of Labor Scientific Research Institute of Virology, Microbiology and Hygiene imeni G. M. Musabekov (Director: V. Yu. Akhundov, academician AzSSR Academy of Sciences), Laboratory of Pediatric Droplet Infections (Head: D. Ya. Kasimova)]

[Abstract] In recent years diptheria cases have been rare, sporadic in AzSSR; the epidemic process was manifested in the form of bacteria carrying; circulation of the pathogen has increased recently. Therefore, bacteriological studies were performed on healthy individuals, sick persons and those who came in contact with patients. Oral and nasal swabs were taken on all examined individuals. Fewer bacteria were found among villagers than among city dwellers. The more prevalent was the variant gravis (64.5%) followed by mitis (34.5%). In most of the cases, the isolated cultures could not be typed by the available agglutinizing sera. References 7: 4 Russian, 3 Western.

7813/12955
CSO: 1840/2238

UDC 577.152.344

LIMITED PROTEOLYSIS OF HUMAN LEUCOCYTE ALPHA-2-INTERFERON AND LOCALIZATION OF ANTIGENIC DETERMINENT FOR MONOCLONAL ANTIBODY BINDING

Moscow BIOKHIMIYA in Russian Vol 50, No 11, Nov 85
(manuscript received 6 Mar 85) pp 1859-1865

[Article by S. V. Kostrov, T. V. Chernovskaya, O. M. Khodova, S. I. Borukhov, A. S. Ryzhavskaya, L. S. Izotova and A. Ya. Strongin, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] The region of alpha-2-interferon which binds the widely used monoclonal antibody NK2 was determined using limited proteolysis with trypsin, pepsin, thermolysin and the intracellular serine protease of Bacillus amyloliquefaciens. The ability of the peptide fragments to interact with the antibody was measured with the immunoblotting technique and NK2 antibody conjugated to peroxidase. The trypsin hydrolysate contained two large peptides, with molecular weights of 12 kDa and 15 kDa, while the peptic hydrolysate contained one peptide, of 14 kDa. The serine protase gave a 15kDa fragment, while thermolysin gave two fragments, 6 kDa and 12 kDa. In the absence of 2-mercaptoethanol, the two thermolysin fragments and the 12 kDa tryptic fragment did not appear. The 15 kDa protease fragment and the 14 kDa pepsin fragment were more stable to further enzyme hydrolysis than the other peptides formed, or than the initial interferon. The 14 kDa fragment was not further hydrolyzed by the serine protease, but it was extensively hydrolyzed by trypsin and thermolysin. Edman degredation indicated that the N-terminal of the 14 kDa peptide is Cys_1-Asp-Leu-Pro-Glu, which is the same as that of the intact interferon. Immunoblotting demonstrated that the 14 kDa and 15 kDa fragments were able to bind the NK2 antibody, while the smaller fragments were not. The data indicate that trypsin cleaves the interferon between Arg_{149} and Ser_{150}, pepsin between Ala_{139} and Trp_{140} and the serine protease between Ile_{147} and Met_{148}. Trypsin also cleaves the interferon between Lys_{112} and Glu_{113}. The antigenic determinent is thus localized between residues 110 and 140. Comparison of the ability of different interferons to bind NK2 indicates that the antigenic determinent of alpha-2-interferon is Glu_{114}-Asp_{115}-Ser_{116}-Ile_{117}. Figures 2; references 21: 3 Russian, 18 Western.

12126/12955
CSO: 1840/283

UDC 614.31:615.918:582.282]-07+612.017.1.014.46:[615.918:582.282

COMPARATIVE ANALYSIS OF EFFECTS OF T-2 and NT-2 MYCOTOXINS ON CELLULAR AND HUMORAL IMMUNITY

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 4 Oct 84) pp 66-68

[Article by V. A. Tutelyan, A. B. Levitskaya, V. A. Lyashenko and S. A. Skhodova, Institute of Nutrition, USSR Academy of Medical Sciences; Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] A comparative analysis was conducted on the effects of mycotoxins T-2 and NT-2 derived from Fusarium sporotrichiella on humoral and cellular immunity of male CBA x C_{57}BL/6 and CBA mice. The LD_{50} of T-2 for the hybrid and CBA mice was calculated at 6.75 and 6.5 mg/kg on intragastric administration, and that for NT-2 was calculated to be 12.75 and 9 mg/kg, respectively. Administration of either T-2 or NT-2 in a 0.1 LD_{50} dose inhibited both humoral and cellular immunity in the test mice, although immunosuppression with NT-2 was far less pronounced than with T-2. T-2 in fact, was immunosuppressive in doses as low as 0.02 LD_{50}. This difference in the immunosuppressive activity was ascribed to the presence of an acetyl group at C_4 in T-2, with NT-2 showing deacylation at that carbon. It appears that, among other considerations, determination of the effects of mycotoxins on splenic antibody-forming cells in response to a challenge with sheep erythrocytes provides a good indication of their immunosuppressive potential. Figures 2; references 11: 3 Russian, 8 Western.

12172/12955
CSO: 1840/2177

UDC 615.9.057.085.272.4.014.425.076.9

PROTECTIVE EFFECT OF ANTIOXIDANTS IN EXPERIMENTAL POISONING

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 25 Feb 85) pp 16-18

[Article by N. P. Setko, Orenburg Medical Institute]

[Abstract] Based on the established cellular mechanisms of poisoning with chemical agents, the author studied the possibility of using lipid peroxidation inhibitors as membrane protectors in chemical poisoning. Experiments were performed on male white rats divided into three groups: one group subjected to inhalation of sulfur-containing gas condensate, another poisoned with sulfur-containing gas condensate which had received a complex antioxidant three days before the experiment and during the experiment, a mixture of α-tocopherol, ascorbic acid and dibunol-2,4-dimethyl-tert-butylphenol in vegetable oil at 100 mg/kg, while the third group was a control. It was found that the poisoning of the rats was accompanied by the appearance of toxic effects, particularly in group 1. The results indicated the possibility in principle of increasing the resistance of the body to chemical contaminants in the air by antioxidant therapy. References 13: 12 Russian, 1 Western.

6508/12955
CSO: 1840/2192

UDC 613.646:613.167:621.38

HYGIENIC ASSESSMENT OF AIR IONIZER FOR BIPOLAR IONIZATION OF AIR IN WORKPLACE IN ELECTRONICS INDUSTRY

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 10 Jul 85) pp 23-25

[Article by A. M. Skorobogatova, M. V. Zvereva, A. P. Zakharov and V. I. Slesarev, Leningrad Sanitary-Hygiene Medical Institute]

[Abstract] A sanitary-chemical evaluation is presented of the air in the workplace in various areas of electronics industry factories where the AISV-2-76 ionizer is used to maintain the proper level of bipolar ionization. A system of group methods was used to determine the content of harmful substances, allowing determination of the oxidation-reduction, acid-base and complex-forming properties of the pollutants. Where the AISV-2-76 ionizer was used, the content of ozone and oxides of nitrogen did not exceed the background concentration, measured with the ionizer turned off. Technological operations involving amines or substances forming amines require sealing of the equipment to prevent their entry into the air. Exposure to air with high oxidizability must be reduced by increasing ventilation. The system of integrated indices used in this study as found to be effective for prediction of the formation of toxic compounds in the air of the workplace. The fact that the concentrations of ozone and oxides of nitrogen were comparable with the ionizer turned on or turned off, and the slight reduction in oxidizability achieved, indicate that harmful substances are not removed from the air by the AISV-2-76 ionizer in large quantities. References 7 Russian.

6508/12955
CSO: 1840/2192

UDC 613.6:631.3:62-784.5

PHYSIOLOGIC-HYGIENIC PREREQUISITES FOR IMPROVEMENT OF PLANNING OF CABINS OF TRACTORS AND AGRICULTURAL MACHINES

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 11 Jul 85) pp 18-20

[Article by V. I. Chernyuk, M. Ya. Bolsunova, O. M. Tkachenko and V. P. Ryabtseva, Kiev Scientific Research Institute of Labor Hygiene and Occupational Diseases]

[Abstract] A study is presented of changes in the functional status of the bodies of various groups of agricultural workers who operate self-propelled machines during the course of the working day as a function of the agreement between the anatomical dimensions of the human body and the dimensions of the working locations in the machines. Some 220 men and 995 women 20-55 years of age were involved in the study. It was found that the variability of body size and physical capabilities of workers is not always considered in the design of cabins of agricultural machines, a source of additional stress on the body during the working day which causes early fatigue and reduced working capacity. The problem of efficient organization of the working location in tractor and combine cabins requires further study. References 5 (Russian).

6508/12955
CSO: 1840/2192

UDC 615.849.19:616.33-089.843-031:616.715

USE OF LASER WELDING FOR CREATION OF EXTRAINTRACRANIAL MICROANASTOMOSES

Moscow VOPROSY NEYROKHIRURGII in Russian No 4, Jul-Aug 85
(manuscript received 28 Feb 84) pp 14-18

[Article by Ya. A. Kupch, V. A. Chernyakov, B. N. Raubishko, S. A. Kadysh and Kh. B. Ayde, Latvian Republic Neurovascular Center, Headed by Prof. G. I. Eninya, Riga]

[Abstract] A new method of so-called laser welding of blood vessels has been developed. Experimental studies of laser joining of vessels showed that up to 20 days after surgery the strength and elasticity of the laser joint were better than those of suture joints. After 20 days the results are equal to those of suture joints. An argon laser--a spectraphysics model 770 with fiber optic light guide, diameter of end of light guide 600 micrometers--is used for the laser welding. In the studies reported in this article, end to side anastomoses were created by methods quite similar to those used with sutures. It was found that laser welding is not suitable for vessels with manifest atherosclerotic changes of the wall with compacted intima of the superficial temporal artery. Figures 6; references 13: 2 Russian, 11 Western.

6508/12955
CSO: 1840/2122

UDC 616.21/.28-085.849.19+615.849.19.03:616.21/.28

USE OF LASERS IN MEDICINE

Moscow VESTNIK OTORINOLARINGOLOGII in Russian No 5, Sep-Oct 85
(manuscript received 8 Jan 85) pp 65-71

[Article by M. Ya. Bezchinskaya and M. T. Aleksandrov, Department of Otorhinolaryngology, Headed by Academician N. A. Preobrazhenskiy, USSR Academy of Medical Sciences, and Department of Stomatology, Headed by Corresponding Member, USSR Academy of Medical Sciences, Prof. N. N. Bazhanov, First Moscow Medical Institute imeni I. M. Sechenov]

[Abstract] This article is a review of pertinent literature. At present a number of works have been published on the results of experimental and therapeutic application of lasers in oncology, ophthalmology, dermatology, surgery, otolaryngology, stomatology, and other specialists. Two trends have been noted in the use of lasers: the use of high energy lasers for purposes of excision and coagulation of tissues; and the use of low-energy lasers for activation of metabolism. Experimental studies have shown that low energy laser radiation has an anti-inflammatory, analgesic effect, changing vascular tonus, improving metabolic processes, accelerating regeneration of tissue and decreasing sensitization. Some note is made of the complications of the use of lasers, including damage to the hands of the surgeon and injury to tissues adjacent to the surgical site. Safety rules for the use of lasers are noted. References 66: 35 Russian, 31 Western.

6508/12955
CSO: 1840/2132

UDC 615.472.03:617-089.819.1:615.849.19:535.8

FIBER OPTIC CATHETER LIGHT GUIDE FOR LASER RADIATION

Moscow MEDITSINSKAYA TEKHNIKA in Russian No 5, Sep-Oct 85
(manuscript received 25 Jul 84) pp 40-42

[Article by V. V. Grigoryants and V. A. Korolev, Institute of Radio Engineering and Electronics, USSR Academy of Sciences, Moscow]

[Abstract] The purpose of this work was to create a laser catheter for coagulation of hemorrhages, destruction of neoplasms and other laser surgical procedures. The device can be used for treatment by introducing it through an endoscope. The light guide channel of the device has an exponential profile of index of refraction and is drawn from fused quartz as a single fiber. The fiber is covered with an optical shell of organosilicon compound 159-167. Laser radiation is input through a lens and diaphragm in a metal tube which facilitates physical mounting of the device onto the laser. During physical testing, transmission of 100 W of laser power for ten minutes did not physically damage the fiber. Figures 2; references 4: 2 Russian, 2 Western.

6508/12955
CSO: 1840/2131

UDC 616.144.1-091.8:576.314

MORPHOFUNCTIONAL CHANGES IN ERYTHROCYTE MEMBRANES IN CERTAIN EXTREME CONDITIONS

Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 85
(manuscript received 26 Dec 84) pp 20-23

[Article by V. A. Odinokova, N. N. Kvitko and A. Ya. Olshanskiy, Moscow Oblast Order of Labor Red Banner Clinical Scientific Research Institute (MONIKI) imeni M. F. Vladimirskiy]

[Abstract] A study is presented of the ultrastructural specifics of the structure of erythrocyte membranes under conditions of prolonged hypoxia during narcosis in cases of infectious-allergic myocarditis, bronchial asthma and pollen allergy. Peripheral blood erythrocytes from 32 endomyocardial biopsies and 34 anterior mediastinum biopsies were studied by transmission electron microscopy. The electron microscope studies show that, in prolonged hypoxia, large pores up to 6-nm is diameter appeared in the erythrocyte membranes. The change in form of erythrocytes was frequently accompanied by the formation of bulges in the erythrocyte membrane, apparently related to the effects of damaging agents on the protein of the membrane. The data of the study indicate the importance of the erythrocytes in maintaining immune homeostasis and force attention to be given to the significance of the disruption of immunocompetence of the erythrocytes in various diseases. They indicate that in the blood and tissues of patients in certain cases there is disruption of the morphofunctional status of the erythrocytes, manifested as a change in the shape of the erythrocytes, the appearance of pathologic structure forms not characteristic in healthy persons. An increase in the number of deformed erythrocytes indicates damage to the membranes of these cells, resulting in disruption of the functioning of the erythrocytes, particularly their immunocompentence which in turn may be one mechanism of loss of immune homeostasis in these diseases. References 18: 8 Russian, 10 Western.

6508/12955
CSO: 1840/2134

UDC 616.233+616.24]-085.451.35

AEROSOL THERAPY IN PULMONARY DISEASES

Moscow KLINICHESKAYA MEDITSINA in Russian No 12, Dec 85
(manuscript received 11 May 85) pp 112-118

[Article by A. N. Kokosov, Division of Nonspecific Pulmonary Disorders Therapy (Director: Professor A. N. Kokosov), All-Union Scientific Research Institute of Pulmonology (Director: Professor N. V. Putov, corresponding member, USSR Academy of Medical Sciences) USSR Ministry of Health, Leningrad]

[Abstract] A review is presented of aerosol therapy which is used increasingly more often in treating bronchial tree problems. Natural aerosols change with the seasons, synthetic ones are reproducible all the time. Dispersiveness and penetration of aerosols are related to their particle size. A considerable portion of the aspirated aerosols is exhaled, the remaining particles are deposited on the mucuous membrane of the respiratory tract. The mechanism of action of various aerosols depends on their pharmacological, physicochemical and organoleptic properties as well as on the state of the mucuous membrane, presence of bronchial secretions, etc. Dosage for serial and single inhalation remains an unresolved problem. There are at least five types of inhalations: vapor, warm moisture, room temperature and oil-based aerosols and dusts. Aerosol therapy should not be used in patients coughing up blood, in those with inflammatory processes, TB, emphysema, pneumothorax, or tumors and in individuals with cardiac and respiratory insufficiency. References 5 (Russian).

7813/12955
CSO: 1840/2231

UDC 616.993.192.1-07

DIAGNOSIS AND TREATMENT OF TOXOPLASMOSIS IN INFECTIOUS CLINIC

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 14 May 84) pp 73-78

[Article by V. Maternova and G. Cator, Medical Faculty, J. Komensky University, Bratislava, Czechoslovakia]

[Abstract] The first diagnosis at the Medical Faculty of toxoplasmosis was made in 1967. In the period since (1967-1982) some 1066 cases have presented with suspicion of toxoplasmosis. Diagnostic confirmation was obtained in 192 cases (18%). The patients were predominantly women (147) under the age of 40, although the age bracket covered the 15 to 49 year span. At the time of diagnosis, the patients had been ill with toxoplasmosis for periods ranging from 2 months to 8 years. In clinical terms, 49.4% of the cases consisted of the lymphoglandular form, 26.5% of the cases were polysymptomatic with predominance of CNS, ocular, cardiac, hepatic, or muscular symptomatology, 9.8% were polysymptomatic without predominance of any one organ or system, and 14% of the cases were genecologic. Four case studies are presented for female patients illustrating the various manifestations and complications, including epilepsy with grand mal seizures and facial paresis. Parasite-directed therapy was in general successful; however, there was a proclivity to recurrence and chronicity. Figures 1; references 13: 6 Russian, 7 Western.

12172/12955
CSO: 1840/2255

UDC 612.127+612.121.2].014.46:547.262"5"

BIORHYTHMOLOGIC ANALYSIS OF ALCOHOL EFFECT ON ACID-BASE BALANCE AND GAS COMPOSITION OF HUMAN BLOOD

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 2, Mar-Apr 86 (manuscript received 5 Mar 85) pp 55-58

[Article by V. P. Latenkov and O. A. Voronov, Biology Department (Chairman: Professor G. D. Gubin), Tyumen Medical Institute]

[Abstract] Effect of alcohol on acid-base balance and on gas composition of the blood was studied on 20 apparently normal male volunteers, 20-26 years of age who were administered 6.2 ml/kg alcohol (80 proof) in a single dose. Prior to alcohol intake diurnal cycle of the above end points was established. Ingestion of alcohol altered significantly both acid-base balance and the gas composition, these changes persisting for two days. Only on the third day was complete recovery of the chronobiological status achieved. The alcohol intake led to subcompensated metabolic acidosis with adequate respiratory compensation. References 10: 9 Russian, 1 Western.

7813/12955
CSO: 1840/2240

UDC 616.98:579.083.185:543.426

BIOLUMINESCENT METHODS AND REAGENTS IN MEDICAL DIAGNOSIS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 7, Jul 85
pp 88-94

[Article by N. N. Ugarova, L. Yu. Brovko, O. V. Lebedeva and I. V. Berezin, Chair of Chemical Enzymology, Chemical Faculty, Moscow State University imeni M. V. Lomonosov]

[Abstract] A cursory description is provided on the development of bioluminescent techniques and reagents for use in medical diagnosis at the Chair of Chemical Enzymology of Moscow State University. Basically, emphasis has been placed on developing systems relying either on bacterial luciferase or firefly luciferase. Considerable improvements have been effected by the use of immobilized enzymes affixed to BrCN-Sepharose, which increased the half-life of the preparations from 20 h at 4°C to more than 33 days. Lyophilized, immobilized preparations have been stored for several months at 4°C without any appreciable loss of activity. An additional advantage of the immobilized enzyme preparations is that they can be reused several times, and have been used for the analysis not only of their substrates (ATP, FMN, $NADH_2$), but also of other compounds and enzymes that can be linked through reaction coupling. The sensitivity of such enzyme-based diagnostic systems is on the order of 10^{-10} to 10^{-13} M, and generally only 2-3 min is required for an analysis. Current efforts are directed at further improvements in sensitivity and specificity, and on the creation of automated systems. Figures 3; references 34: 5 Russian, 29 Western.

12172/12955
CSO: 1840/2270

UDC 613.49:661.185]-07:616.154

COLORIMETRIC DETERMINATION OF ANIONIC SURFACTANTS IN BLOOD SERUM

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 24 Apr 85) pp 68-69

[Article by O. I. Voloshchenko and L. G. Golenkova, Kiev Scientific Research Institute of General and Communal Hygiene imeni A. N. Marzeyev]

[Abstract] The authors studied the possibility of using a colorimetric method utilizing methylene blue to determine anionic surfactants in biological media. The method cannot be directly applied to blood serum due to the high content of various components, including protein, capable of attaching and retaining the surfactant and hindering the extraction of samples. A modification was suggested to the method, consisting of preparation of blood serum for analysis by precipitation of the protein using caustic soda and zinc sulfate. The method suggested can be used in hygienic and biological studies for analysis of anionic surfactants which have entered the body through various paths. References 6: 5 Russian, 1 Western.

6508/12955
CSO: 1840/2192

UDC 616.441-006.5-06:616.441-003.61]-085.31:546.34

LITHIUM CARBONATE COMBINED THERAPY OF DIFFUSE TOXIC GOITER

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 57, No 12, Dec 85
(manuscript received 2 Apr 84) pp 32-35

[Article by N. M. Petrov, Department of Elective Therapy, Headed by Prof. V. V. Trusov, Izhevsk Medical Institute]

[Abstract] A clinical study is presented of the antithyroid effect of lithium carbonate to define its place in combined therapy of diffuse toxic goiter. Some 163 patients, 19 males and 144 females, 20 to 55 years of age with histories of 1 to 3 years of thyrotoxicosis were studied. Conservative therapy was prescribed in all cases: 63 patients received lithium carbonate, while groups of 58 and 42 patients received lithium in various combinations with mercazolyl. Forty more patients received mercazolyl alone. Lithium was found to have a sedative effect, causing the patients to become less irritable, sleep better and complain less frequently of headache and pain in the area of the heart. The best results of treatment were found in the patients of groups 2 and 3, which received both lithium and mercazolyl. The concentration of thyroid hormones in the blood serum dropped very rapidly in pati patients who received lithium carbonate for 1 to 2 weeks, then mercazolyl. Addition of lithium carbonate to mercazolyl caused deeper and more reliable changes in the hormone profile, but the combination of the two preparations increased the risk of hypothyreosis. Lithium carbonate is thus demonstrated to be useful in combined treatment for diffuse toxic goiter as an addition to the traditional antithyroid preparations (imidazole derivatives) to increase the thyrostatic effect. References 21: 5 Russian, 60 Western.

6508/12955
CSO: 1840/2136

UDC 578.833.1:578.4

ECOLOGIC MECHANISMS OF ARBOVIRUS EVOLUTION

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript recieved 5 Jun 85) pp 30-34

[Article by S. P. Chunikhin, Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow]

[Abstract] Basic facts and hypotheses are reviewed on the evolution of viruses in general, and the so-called arboviruses in particular. Evaluation of the data and behavior of some 400 arboviruses indicates that the primary hosts were arthropods. Both Bunyaviridae and Togaviridae are transmitted in the transphasic and transovarial manner in arthropods (mosquitoes, ticks), and in a number of cases via the sexual route (with sperm from tick to tick or with accessory sexual gland secretions from mosquito to mosquito). The circulation pathway that involves the vertebrate host is dependent on a high-concentration viremia. These observations suggest that the arboviruses evolved in the arthropods, developing the unique ability to replicate at widely different temperatures in the cells of the arthropod and vertebrate hosts. The latter renders the arboviruses adaptable to a wide variety of climatic zones and imparts to them the ability to establish themselves in any new ecological niche created through anthropogenic activity or otherwise. References 10: 9 Russian, 1 Western.

12172/12955
CSO: 1840/2256

UDC 616.993.161-07

EVOLUTION OF INTERRELATIONSHIP AMONG MEMBERS OF THE LEISHMANIAL PARASITIC SYSTEM

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86 (manuscript received 10 Nov 85) pp 43-48

[Article by V. M. Safyanova, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamalyeva, USSR Academy of Medical Sciences, Moscow]

[Abstract] One of the key factors in the evolution of the interrelationships among the members of the leishmanial parasitic cycle is the fact that each species of the parasite has an extreme host specificity for a particular species of sandfly (Phlebotomus). Although taxonomic classification of the parasite is difficult because of apparent lack of morphologic differences and the fact that each exists in two morphologic forms (amastigote and promastigote), natural selection appears to tend to greater speciation in terms of the vertebrate and invertebrate hosts. Such extreme specifity is predicated on the 'ecologic niches' formed by the cutaneous membranes and the internal organs of mammals and reptiles, and the different regions of the alimentary canal in the various sandfly species. As a result of such mutual adaptations, parasitic systems arise with specificity dependent on their level of evolutionary development. The amastigotes and the promastigotes differ markedly in biochemical and physiological properties. These differences determine their survivability in the different hosts, and set the stage for host specificity. References 22: 11 Russian, 11 Western.

12172/12955
CSO: 1840/2256

UDC 578.833.1:578.4(049.32)

ECOLOGY AND GEOGRAPHIC DISTRIBUTION OF ARBOVIRUSES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86, pp 83-87

[Article by A. N. Alekseyev, Moscow, reviewing book by S. P. Chunikhin and G. A. Leonova, EKOLOGIYA I GEOGRAFICHESKOYE RASPROSTRANENIYE ARBOVIRUSOV, Moscow, Meditsina, 1985, 128 pp]

[Abstract] This small book deals largely with the ecology of arboviruses. The second half of the title is misleading in that the book lacks any maps indicating the distribution of these viruses. In addition, the book deals exclusively with the USSR, and to that extent the title should have identified the contents by incorporating USSR in the title. Although, because of time lag involved with the publication of the book, there are some omissions and some of the conclusions cannot be fully shared, the book on the whole makes a valuable contribution in presenting the arbovirus problem in a consise form. The authors conclude that perseverance of arboviruses in nature is due to their adaptation to their invertebrate hosts. Therefore, primary efforts at control of arbovirus infections should be directed at the eradication or control of such hosts.

12172/12955
CSO: 1840/2256

UDC 616.98:579.842.14]-06:616-001.36-091

MORPHOLOGICAL CORRELATES OF SEPTIC SHOCK IN SALMONELLOSIS

Moscow ARKHIV PATOLOGII in Russian Vol 47, No 12, Dec 85
(manuscript received 18 Dec 84) pp 61-64

[Article by Yu. N. Anisimova, Yu. A. Barshteyn and N. P. Kuzminskiy, Pathomorphology Laboratory, Kiev Scientific Research Institute of Epidemiology and Infectious Diseases imeni L. V. Gromashevskiy; Pathoanatomical Department, No 7 Clinical Hospital, Kiev]

[Abstract] The case study is presented of a 34 year old male, who presented at the hospital on the 4th day of salmonellosis after attempting a self-cure by alcoholic intake. The course of the patient was stormy with progressive deterioration, marked by delirium (tremens ?), hypovolemic shock, intestinal hemorrhage and onset of disseminated intravascular coagulation on the 8th day of illness. Despite antiinfectious and antishock therapy the patient succumbed on the 15th day of illness while in coma, with BP 80/40 mmHg and thrombophlebitic superficial veins. The prolonged course and lethal outcome of this infection with S. stanley was ascribed to disseminated intravascular coagulation, which led to capillary damage and pulmonary and cerebral edema. Despite extensive necrotic changes in the renal tubules, gastrointestinal epithelium, adrenal glands, and neuronal tissue, the glomerular capillaries were free of thrombi (probably because of intravitam thrombolysis).
Figures 1; references 8: 5 Russian, 3 Western.

12172/12955
CSO: 1840/2217

UDC 579.69;579.22

OXIDATION OF INORGANIC SUBSTRATES BY NITRIFYING BACTERIA IN ACID MEDIUM

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 86, pp 50-60

[Article by M. R. Kamalov, A. N. Ilyaletdinov, A. T. Kanayev and Ye. A. Vladimirova, Institute of Microbiology and Virology, Kazakh SSR Academy of Sciences]

[Abstract] Data are presented on the oxidation of ammonia by bacteria isolated from the water of Pb-Zn deposits in Kazakhstan in an acid medium. The medium employed in the study had the following formulation (per liter of tap water): 2-3 g $(NH_4)_2SO$, 0.5 g K_2HPO_4, and 0.5 g $MgSO_4 \cdot 7H_2O$, acidified with sulfuric acid. The energy derived from the oxidation of ammonia served to promote assimilation of CO_2 by the rods, while the nitrous acid formed in this process was responsible for the catalytic oxidation of a variety of inorganic substrates (Fe^{2+}, S°, ZnS, etc.). Figures 6; tables 1; references 15: 12 Russian, 3 Western.

12172/12955
CSO: 1840/2276

UDC 582.28:531.527

ANTAGONISTIC ACTION OF SOIL FUNGI IN ALMA-ATA OBLAST AGAINST ROOT ROT AGENT

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 86, pp 88-89

[Article by B. D. Yermekova and A. A. Abirova, Institute of Botany, Kazakh SSR Academy of Sciences]

[Abstract] Studies were conducted on the soils in the Alma-Ata Oblast to identify microscopic fungi with potential antagonistic activity against Drechlera sorokiniana Sacc., the pathogenic agent responsible for root rot. Of the 205 isolates tested, 8 (18.53%) were found to possess antagonistic activity. The highest number of antagonists was isolated from dark-chestnut soil (25.41%), with the greatest degree of antagonistic activity exhibited by Trichoderma harzianum and Penicillium purpurogenum. Black chernozem soil yielded 23.08% of the antagonistic isolates, with T. harzianum showing the greatest activity. The steppe serozem yielded 17.66% of the active isolates (P. purpurogenum and Aspergillus flavus), and the light-chestnut irrigated soil yielded 15.37% of the isolates with activity (T. harzianum and P. funicolosum). Tables 1.

12172/12955
CSO: 1840/2276

UDC 678.245.08-616.98

EFFECTS OF CYTOTOXIN PRODUCED IN HUMAN EXPLANTS INFECTED WITH TYPE A INFLUENZA VIRUS ON HISTONE SYNTHESIS IN CHICK EMBRYO FIBROBLASTS

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 86, pp 89-90

[Article by L. I. Shakhvorostova, V. S. Golubchikov and N. M. Derevtsova, Institute of Microbiology and Virology, Kazakh SSR Academy of Sciences]

[Abstract] Chick embryo fibroblast culture was exposed to culture fluids from human explants infected with influenza virus A/Bangkok/1/79-(H3N2), to assess the effects of cytotoxin on histone synthesis. The cytophotometric studies demonstrated that fluids derived from 2 and 5 day embryonic lung explant induced histone synthesis. An increase in histone synthesis in the chick monolayer culture was also obtained with fluids derived from the 5 and 7 day renal and the 1 and 2 day hepatic explants. No effects on histone synthesis were obtained with culture fluids obtained from uninfected human tissue explants. These observations provide additional confirmation for the wide-ranging effects of cytotoxin, and the fact that cytophotometry can be used to monitor such changes. References 4: 3 Russian, 1 Western.

12172/12955
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UDC 614.31:637.1:579.842.14

DETECTION OF TYPHOID FEVER AND PARATYPHUS PATHOGENS IN DAIRY PRODUCTS BY "MOBILE GROWTH" METHOD

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 16 Jul 85) pp 46-48

[Article by V. M. Yegoryan and G. I. Gerok, Astrakhan Branch, Central Scientific Research Institute of Epidemiology, USSR Ministry of Health; Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow]

[Abstract] A comparative evaluation is presented of the sensitivity of the generally used method for detection of Salmonella and the "mobile growth" method for use in dairy products. The mobile growth method uses an original dry medium, a powdered preparation containing (in wt%) peptone 15, dry ox bile 17.5, mannite 24.5, bromthymol blue 0.07, sodium chloride 5.2, calcined soda 0.65, dry nutrient agar to 100. The mobile growth method is found to have clear advantages in detection of Salmonella at all levels, particularly low levels of contamination. In addition to its greater sensitivity, it also requires significantly less time than traditional methods. Almost all negative results are obtained on the second day, positive results on day 3 or 4. References 6: 3 Russian, 3 Western.

6508/12955
CSO: 1840/2192

UDC 617-001-089.168-06:616.98:579.841.11-022.369

CONTAMINATION OF ENVIRONMENT OF TRAUMATOLOGY HOSPITAL WITH GRAM-NEGATIVE OPPORTUNISTIC MICROORGANISMS AND ASSESSMENT OF METHODS FOR THEIR DETECTION

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 29 Jul 85) pp 8-11

[Article by R. Kh. Yafaev, L. P. Zuyeva, G. I. Sukhomlinova, S. A. Linnik and V. V. Dudareva, Leningrad Sanitary-Hygiene Medical Institute]

[Abstract] A study is presented of the contamination of various objects in a traumatologic hospital with gram-negative opportunistic microorganisms (Proteus and Pseudomona aeruginosa), as well as an assessment of methods for their detection. Materials were taken from the air, soft and hard items of equipment, instruments and solutions once per week for one year. Studies were performed both during and between operations and various other treatments. Microbial contamination in the department of traumatology was found in 14.82 $\pm$0.81% of specimens, gram-negative opportunistic pathogens in approximately half the contaminated samples. Proteus was found in 1.89% of samples, Ps. aeruginosa in 0.68%. Of the other gram-negative opportunistic microorganisms, Enterobacter was most frequently found. Gram-negative microorganisms were found in 4.42% of air samples and 8.68% of smears taken from various objects in the hospital. The frequency of contamination varied directly with the frequency of treatments. Nutrient media P_1 and P_2 were found to be highly effective in detecting Proteus as well as other representatives of gram-negative flora, particularly Enterobacter. Media A_1 and A_2 are not effective in detection of Ps. aeruginosa. References 7: 6 Russian, 1 Western.

6508/12955
CSO: 1840/2192

UDC 612.111.3.014.426

EFFECTS OF INTENSITY AND DURATION OF CONSTANT MAGNETIC FIELD ON ERYTHRON RESPONSE

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 6, Nov-Dec 84 (manuscript received 22 Apr 83) pp 72-75

[Article by S. A. Grebennikov and A. D. Pavlov, Chair of Pathologic Physiology, Ryazan Medical Institute imeni Academician I. P. Pavlov]

[Abstract] An analysis was conducted on the response of the rat erythron to exposure to a constant magnetic field for 3 and 24 h with 100 and 300 mT induction forces. In the Wistar and outbred male rats, both exposures and intensities evoked a similar response on the part of the erythron, consisting of a redistribution of the reticulocytes from the bone marrow to the peripheral circulation within an hour. In addition, 72 h after exposure the sera of both categories of rats induced erythropoiesis in F_1 (CBA x C_{57}Bl) mice. The erythropoietic response was somewhat greater after 3 h of exposure than after 24 h of exposure. In addition, the 3 h exposure was found to increase variability in the various erythron indicators (RBC count, half-life, erythropoiesis) and the 24 h to diminish such variability, indicating that prolonged exposure resulted in adaptation of the erythron to the magnetic field. Figures 2; references 14: 9 Russian, 5 Western.

12172/12955
CSO: 1840/2239

UDC 616.072.7(07.07:573.7)

EKG ANALYSIS OF MAGNETIC FIELD POLARITY EFFECTS

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 121, No 2, Feb 86 (manuscript received 29 Jun 84) pp 417-420

[Article by D. D. Tvildiani and T. I. Chlaidze, Tbilisi State Medical Institute]

[Abstract] An EKG study was conducted on rabbits to assess the effects of polarity of constant magnetic fields (125 oe) on the heart. Location of the north pole on the right side of the thoracic cavity for 60 min showed that in 5% of the cases (19 rabbits, 60 experiments) the heart rate was unaffected, in 40% of the cases tachycardia was induced, and in 55% of the cases bradycardia appeared. The general features on EKG included depression of the P and T waves and distortion of the R wave, along with extrasystolic arrhythmia. Immediately after cessation of the exposure -- but in some cases 24-48 h later -- an increase in the amplitude of the P and T waves was observed. A normal EKG pattern was usually not seen until 3 days after the exposure. Location of the north pole on the left side of the chest failed to induce any changes on the EKG in 25% of the cases. In 50% of the cases the T wave was either depressed or markedly elevated. The date demonstrated that the effects of a constant magnet on the heart depend on the location of the north pole vis-a-vis the heart, and that alterations in the EKG are much more pronounced when the north pole is located to the right of the heart. Figures 2; references 9: 5 Russian, 4 Western.

12172/12955
CSO: 1840/1231

UDC 613.632.4:547.562.4'261+615.917:547.502.4

TOXICOLOGY OF PARA-METHOXYACETOPHENONE

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 9 Apr 84) pp 86-87

[Article by M. I. Makaruk and L. V. Vagonova, Kaluga Oblast Sanitary Epidemiologic Station]

[Abstract] A summary is presented of standard toxicological experiments on animals (albino rats and mice, guinea pigs) conducted with p-methoxyacetophenone, in conjunction with clinical reports on exposed workers. On the basis of the available data, p-methoxyacetophenone can be classified as a class III chemical hazard characterized by pronounced skin absorption requiring protective clothing. Exposure in the course of a working day resulted in anosmia and a number of cardiovascular changes (e.g., hypertension, accelerated pulse rate) which were of a reversible nature for the most part after discontinuation of work. Evaluation of the data indicated that, on a preliminary basis, occupational exposure should not exceed a level of 3 mg/m^3. References 4 (Russian).

12172/12955
CSO: 1840/2177

UDC 613.632.4+614.72]:547.538.141]-074:543.544

GAS CHROMATOGRAPHIC DETERMINATION OF STYRENE CONCENTRATIONS IN AIR AS DIBROMOSTYRENE

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 27 Nov 84) pp 45-46

[Article by V. F. Novitskiy and A. L. Pertsovskiy, Belorussian Scientific Research Sanitary Hygienic Institute, Minsk]

[Abstract] A method has been devised to monitor styrene concentrations in air by gas chromatography. Initially, styrene from the air is absorbed into highly purified n-hexane cooled to -2 to -7°C by a water:salt:ice (1:2:3) bath. Subsequent addition of freshly prepared Br_2 solution in 10% ethanol is used for bromination of styrene to dibromostyrene. The latter is vaporized at 250°C and injected into a N-super (0.125-0.16 mm) + 5% silicon OV-17 column at 160°C. An electron capture detector is employed for signal analysis, yielding linearity in the 0.02-100 ng range. The minimal detectable concentration of 1,2-dibromostyrene is 0.025 ng/2 µliter (0.01 ng in terms of styrene), which allows for the determination of 0.005 mg/m^3 of the monomer in a 5 liter air sample. If this level of sensitivity is too low, the n-hexan hexane solution is evaporated to dryness, the residue dissolved in 0.2 ml of isooctane, and the chromatography repeated. With the latter step the sensitivity improves to 0.0002 mg/m^3 with a 5 liter sample, with an analytical error of less than 10%. Figures 1; references 2: 1 Russian, 1 Western.

12172/12955
CSO: 1840/2178

UDC 615.9.015.36.07

RAPID METHOD FOR DETERMINATION OF MEDIAN LETHAL DOSES OF CHEMICAL SUBSTANCES

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jan 85
(manuscript received 6 Dec 84) pp 46-48

[Article by T. V. Pastushenko, L. B. Marushiy, A. A. Zhukov and Yu. A. Pilipenko, Ternopol Medical Institute]

[Abstract] A rapid tabular method has been devised for the determination of LD_{50} values for chemical substances, with the calculations based on the mathematical rationale proposed by B. M. Shtabskiy [Farmakol. i Toksikol., No 4:497-502, 1978 & No 10: 49-51, 1980]. In a preliminary test on 1-2 animals an approximate order of the lethal dose is delineated by testing a ten-fold range of doses (e.g., 1, 10, 100, 1000 mg/kg). In the second step three groups of animals, with three animals per group, are injected with doses numerically equivalent to three sequential doses indicated in a table based on the Shtabskiy work, which correspond to the logs 1, 1.1, 1.2 ... 1.900, 1.925, 1.950 and 1.975. For the determination of LD_{50} the mortality in one group should exceed 50% (but less than 100%), and in the other two groups should be less than 50% (but more than 0%), or vice versa. If such a situation does not prevail, then two additional doses are tried to cover the expected area. The LD_{50} results are read from the table, along with the confidence limit at $P = 0.05$. References 7 (Russian).

12172/12955
CSO: 1840/2178

UDC 613.632.4+614.72]:66.062

GAS CHROMATOGRAPHIC DETERMINATION OF ORGANIC SOLVENTS IN AIR

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 24 Jul 84) pp 48-50

[Article by S. A. Dzhagatspanyan, Yerevan Branch, All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics]

[Abstract] A gas chromatographic method was devised for the analysis of air concentrations of hexane, cyclohexane, and toluene in combination with methyl ethyl ketone. The immobile phase consisted of 15% carbowax 20 M applied to siliconized absorbent (0.20-0.36 mesh). Using an evaporator temperature of 125°C and a column temperature of 100°C in conjunction with a flame-ionization detector, detection limits of 0.1 mg/m^3 were obtained for hexane and cyclohexane, and of 0.2 mg/m^3 for toluene and methyl ethyl ketone, with standard deviations of $\pm$0.5 to $\pm$5.23. Figures 2; tables 2; references 5 (Russian).

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CSO: 1840/2178

UDC 614.777:615.91-074:543.862.34

PREDICTING TOXICITY FROM MOLECULAR CONNECTIVITY INDEX

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 21 Sep 84) pp 15-17

[Article by Z. I. Zholdakova, Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow]

[Abstract] In view of the success of using molecular connectivity data to predict pharmacological and biological activity of drugs, this approach was extended to the prediction of toxicity of a variety of chemical agents. Regression-correlation analysis of the relationship between molecular connectivity and LD_{50} was conducted on 24 aliphatic amines in one series of experiments and in another series on a mixed group of benzene and phenol derivatives and substances related to carbon tetrachloride and dichloromethane. Mathematical analysis of the results demonstrated that on single administration, biological effects depended largely on the energetic and electronic characteristics of the molecules, while their dimensions and formulae were of secondary importance. The index of molecular connectivity was basically useful in predicting toxicity only within a series of structurally similar compounds. Consequently, molecular connectivity cannot be used as a substitute for experimental studies on animals since it cannot be used to characterize the whole gamut of pharmacokinetic factors that determine biological activity, particular in long-term exposure. References 7: 4 Russian, 3 Western.

12172/12955
CSO: 1840/2177

UDC 616.155.36-02:615.919:595.799+616-056.43 022.913:595.799]-07:616.155.36

EFFECT OF VESPA ORIENTALIS VENOM FRACTIONS ON RAT MAST CELLS AND HUMAN BASOPHILS

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 2, Mar-Apr 86 (manuscript received 16 Apr 85) pp 62-65

[Article by I. S. Gushchin, A. I. Zebrev, A. I. Miroshnikov and M. U. Tuychibayev, Institute of Immunology, USSR Ministry of Health, Moscow; Institute of Biochemistry, UzSSR Academy of Sciences, Tashkent]

[Abstract] The effect of the intact venom of the hornet Vespa orientalis and its fractions obtained by Sephadex G-75 gel filtration was studied on rat large cells and human basophils. Seven fractions of the venom were obtained in an ammonium formate buffer. Two of these fractions, F-IV and F-V, exhibited significant dose dependent histamine-releasing activity fully comparable with intact venom. These fractions contained peptides HR-1 and Hr-2 which seemed to be responsible for allergic reactions resulting from the hornet stings. Low doses (10-20 μg/ml) of F-IV and F-V caused noncytotoxic effects on cells while the higher doses (100 μg/ml) led to cytotoxic alterations. Figures 4; references 14: 9 Russian, 5 Western.

7813/12955
CSO: 1840/2240

UDC 614.777:547.533]-074

DETERMINATION OF MONOCHLOROTOLUENES IN WATER

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 22 Jul 85) pp 53-54

[Article by V. S. Kozlova, Kiev]

[Abstract] The author has developed a method for determining monochlorotoluenes in water on a chromatograph with a flame-ionization detector. Specimens were concentrated by placing 10 ml of the specimen in a threaded 30 ml flask which was then sealed with a threaded plastic cap containing a 1-2 mm diameter aperture. A rubber cover was placed on the cap with a teflon film insulator beneath it, specimens were thermostated, vapor-air mixture withdrawn with a heated medical syringe and chromatographed using a 1 m long metal column, inside diameter 3 mm, adsorbent 20% PEHA, chromaton N-AW, 0.25-0.315 mm fraction, column thermostat temperature 150°C, evaporator temperature 200°C, nitrogen carrier gas flow rate 1.2 l/min, ratio of flow of nitrogen, hydrogen and air 1:1:10, recording tape speed 200 mm/hr, monochlorotoluene exit time 1.5 minutes. Error permissible for determination of maximum permissible concnetrations can be achieved with four parallel determinations. Six parallel determinations are required for measurement of mass concentrations of monochlorotoluene at half the MPC. References 2 (Russian).

6508/12955
CSO: 1840/2192

UDC 615.014.45:547.441:615.917

USE OF GLUTARALDEHYDE FOR STERILIZATION OF MEDICAL PRODUCTS OF THERMALLY LABILE MATERIALS (TOXICOLOGIC, ANALYTIC AND PHYSICOMECHANICAL STUDIES)

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 14 Jun 85) pp 13-16

[Article by P. P. Lyarskiy, A. E. Epshteyn, A. N. Sukiasyan, L. S. Kopylova, N. P. Mikhaylov, A. I. Kopylova, T. I. Rapina and R. A. Vyshegorodskaya, All-Union Scientific Research Institute of Disinfection and Sterilization, Moscow]

[Abstract] A study was made of the toxicologic properties of gultaraldehyde and an estimate produced of the maximum permissible residual quantities on sterilized products. Toxicologic studies were performed on laboratory animals, revealing that the LD_{50} for intragastric and subcutaneous administration for all animals tested was 156-308 mg/kg. When introduced into the abdominal cavity, glutaraldehyde was more toxic (LD_{50} 22 and 32 mg/kg for mice and rats). Comparison of the actual residual quantities of glutaraldehyde found on specimens and products of thermally-labile plastics and other materials with the permissible doses can be used to produce recommendations for use of the preparation. Medical products which will contact mucous membranes and other tissues except for blood, such as catheters, endoscopic fittings, etc., can be sterilized with glutaraldehyde. Rubber and polyvinyl chloride products sterilized with glutaraldehyde should be used only with limited surface contact with blood, though products of polyethylene, polypropylene and polystyrene in long-term contact with blood can be sterilized with glutaraldehyde. Glutaraldehyde should not be used more than 20 times for sterilizing rubber products. References 5: 4 Russian, 1 Western.

6508/12955
CSO: 1840/2192

UDC 615.917:[62-631.2:62-623.1].07

TOXICOLOGIC FEATURES OF NEW GASOLINE-METHANOL MOTOR FUEL MIXTURE

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 19 Dec 84) pp 11-13

[Article by V. S. Kushneva, I. G. Koltunova and G. A. Koloskova]

[Abstract] The toxic properties of a field mixture containing 76.4 wt.% gasoline, 14.8 wt.% methanol and 8.8 wt.% isobutanol were studied on 450 white mice, 700 white rats, 50 rabbits and 12 guinea pigs with intragastric administration of the liquid, inhalation of the vapor and application of the liquid to the skin. Following one-time or long-term (four months) exposure, the animals were tested to determine physiological, hematologic, biochemical, immunologic, morphologic, ophthalmologic and gonadoembryologic effects. Intragastric administration revealed the mixture to be 3.4 times more toxic than gasoline, less toxic than methanol and isobutanol. Changes in the conditions of the animals caused by sublethal doses were found to be unstable, disappearing when exposure was stopped. The changes were less strong in some cases than those produced by separate exposure to the components of the mixture. Hygienic standardization should be performed based on each component of the mixture: the MPC of gasoline is 100 mg/m^3, methanol 5 mg/m^3, isobutanol 10 mg/m^3. The eyes should be protected from direct contact with the mixture, and skin contact should be monitored to maintain the maximum permissible level of 0.02 mg/cm^2. References 3: 2 Russian, 1 Western.

6508/12955
CSO: 1840/2192

COMBINED UTILIZATION OF NONDEPOLARIZING MYORELAXANTS

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 2, Mar-Apr 86, pp 52-53

[Article by V. L. Vanevskiy, K. T. Apasov and A. F. Danilov, Department of Anesthesiology and Reanimatology, Leningrad Order of Lenin and Order of October Revolution Institute for the Advanced Training of Physicians imeni S. M. Kirov; Laboratory of the Pharmacology of Biologically Active Substances, Institute of Evolutional Physiology and Biology imeni I. M. Sechenov, USSR Academy of Sciences]

[Abstract] An attempt was made to improve the properties of nondepolarizing myorelaxants by selecting an optimal combination of preparations, using the following agents: tubocurarine (tubarine), arduan (pipecurium), pavulone (pancuronium) and domestic terkuronium. Experiments were performed on anesthesized cats. The greatest synergistic effect was observed with the mixture pavulonarduan; considerable potentiation of the blocking action was observed with the mixture of tubarin-arduan. No other mixtures showed any potentiation of their action. One of the more important parameters of the action of myorelaxants was duration of nerve-muscular block.

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UDC 615.216.2+615.015.44

MOLECULAR MECHANISMS OF ACTION OF LOCAL ANESTHETIC AGENTS

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian No 2, Mar-Apr 86, pp 59-62

[Article by N. A. Mokhort, Kiev Scientific Research Institute of Pharmacology and Toxicology (Director: Professor F. P. Trinus)]

[Abstract] A review is made of local anesthetic agents (LA) which contain both natural and synthetic compounds of the following classes: complex p-amino-benzoic acid esters, substituted acetanilide amides and substituted cholinecarboxyamides. LA prevent appearance and transmission of an impulse along the axons. Their site of action is the electrically stimulated membrane; they react directly with ultraprotein structures or indirectly by affecting the lipids surrounding the protein. E. M. Peganov proposed the theory of LA action on Na channels in the electrically stimulated membrane because decreased permeability by Na ions plays a role in the mechanism of action of the LA. Actually, LA also block the conductivity of K ions. By competing for the Ca binding sites they also depress the activity of Ca-dependent ATPase. In addition to affecting the axon membrane LA also react on the synaptosomal level. Many LA exhibit an antagonistic effect on endogenous histamine and serotonin; in low doses they increase conductivity of smooth muscles of the respiratory tract and at higher doses they lead to their relaxation. Unaltered LA dissolve in membrane lipids and cause various physical chemical changes in them. References 47: 9 Russian, 38 Western (1 by Russian authors).

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CSO: 1840/2230

UDC 576.895.772

EFFECTIVENESS OF MANY-YEARS USE OF TRAPS IN HORSEFLY (DIPTERA, TABANIDAE) CONTROL

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 3, May-Jun 85 (manuscript received 24 May 84) pp 41-44

[Article by R. P. Pavlova, All-Union Scientific Research Institute of Veterinary Entymology and Arachnology, Tyumen]

[Abstract] Long-term studies (1973-1980) were conducted in the Yarkovskiy Rayon of Tyumen Oblast on the control of horseflies on forest pastures, by the use of flytraps. The use of 20-25 insecticide-containing flytraps with CO_2 as attractant was successful in reducing the horsefly population, consisting largely of Hybomitra bimaculata, H. ciureai, H. lundbecki, H. muehlfeldi, and H. pluvialis, by 77.2-92.7% on pastures containing 97-100 or 190-200 heads of cattle. Without any additional measures at horsefly control the effects persisted during the next grazing season. This approach was found to be an effective solution to horsefly control on pastures without the use of insecticides on a large-scale basis. References 17: 1 Ukrainian, 13 Russian, 3 Western.

12172/12955
CSO; 1840/2255

MEDICAL APPLICATIONS OF SYNTHETIC NEUROPEPTIDES

Moscow KRASNAYA ZVEZDA in Russian 19 Apr 86 p 4

[Article by Doctor of Medical Sciences R. Kruglikov, Academy of Pedagogic Sciences]

[Abstract] Scientists have succeeded in creating synthetic neuropeptides which are long-lived and millions of times more active than natural neuropeptides. Some neuropeptides are already at use in medicine, vasopressin having been found to strengthen conditioned reflexes as in the treatment of alcoholism. Soviet scientists have also discovered receptors in brain cells which are sensitive to narcotics such as morphine. This gives hope for the creation of synthetic narcotics which will be more effective and less dangerous than morphine. The neuropeptides responsible for producing the sensation of hunger and of thirst are now known, as well as those which stimulate motor activity or sleep. This knowledge will facilitate the development of new, nontraditional medications.

6508/12955
CSO: 1840/1184

E. P. KEMERTELIDZE--SCIENTIST AND ORGANIZER

Tbilisi ZARYA VOSTOKA in Russian 4 Apr 86 p 3

[Article by Leonid Melikadze, academician, Georgian SSR Academy of Sciences and Mikhail Patsuriya, Scientific Secretary, Institute of Pharmaceutical Chemistry imeni I. G. Kutateladze, GSSR Academy of Sciences, candidate of chemical sciences]

[Abstract] This article celebrates 40 years of scientific work by Etera Petrovna Kemertelidze, director of the Institute of Pharmaceutical Chemistry imeni I. G. Kutateladze, Georgian Academy of Sciences. Kemertelidze graduated from Tbilisi State Pharmaceutical Institute in 1946 and has concentrated her scientific activity on the study of the flora of Georgia in the search for biologically-active substances and the creation of medically significant preparations. She has been particularly successful in the study of cardiac glycosides and is considered a leading specialist in this area. In 1960 she organized the Department of Phytochemistry, which she continues to lead today. She had been a leader in the study of lipids as biologically active compounds. She is the author of 255 scientific publications and 5 monographs, and has been active in the training of scientific workers. A communist since 1946, she is active in Party affairs. She has been awarded the Order of Red Banner of Labor.

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DETERMINATION OF MICROQUANTITIES OF CERTAIN SYM-TRIAZINES IN AIR

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 17 Jun 85) pp 89-90

[Article by M. S. Petrosyan, All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Yerevan Branch]

[Abstract] The purpose of this work was to develop conditions for concentration and determination of trace quantities of methazine, sulfazine, and components of the hybrid mixture caragard in the air of the work place. These substances are symmetrical triazine herbicides widely used in agriculture. Blue-strip filters were found to be most effective for absorption of aerosols of these compounds. The methazine and caragard were extracted by chloroform or acetone three times with periodic shaking. Combined extracts were dried with anhydrous sodium sulfate and concentrated on a rotary evaporator at not over 80°C to a volume of 0.2-0.3 ml (original volume 25-30 ml). The solvent was evaporated dry in air. The dry residue was dissolved in 1 ml acetone and determination made by gas-liquid or thin-layer chromatography. The concentration of the preparation in the air was calculated using known equations. The method is intended for sanitary-chemical monitoring of the process of using these preparations in agriculture. References 2 (Russian).

6508/12955
CSO: 1840/2192

UDC 613.632+615.917]547.241]:]616.8-008.931:577.152.311

CHOLINESTERASE ACTIVITY AND ATP IN DEVELOPMENT OF LONG-TERM NEUROTOXICITY CAUSED BY TRI-O-CRESYL PHOSPHATE

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 8 Feb 85) pp 80-81

[Article by U. A. Kuzminskaya, L. M. Veremenko and L. V. Bersan, All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers, and Plastics, USSR Ministry of Health, Kiev]

[Abstract] A study is presented of the cholinesterase and ATPase activity of nervous tissue at various times during the development of long term neurotoxicity as a result of exposure to tri-O-cresyl phosphate (TOCP). Cholinesterase activity was determined in the brain stem, spinal cord, sciatic nerve and blood. ATPase activity was determined in the brain and spinal cord. Experiments were performed on chickens which received TOCP orally one time at 1000 mg/kg body mass. It was found that during the first few days after administration of TOCP, the leading pathogenic factor in developing neurotoxicity is depression of cholinesterase activity, characteristic for organophosphorus compound poisoning. An increase in ATPase activity observed during this time is a protective-compensatory reaction of the nerve tissue to the toxic effects. Later, the pathogenic mechanism responsible for the development of clinical manifestations of paralysis is inhibition of the activity of K^+, Na^+-dependent ATPase, in the peripheral nerves -- cholinesterase, enzymes which play a leading role in the generation, transmission and conduction of nerve pulses. These changes in enzyme activity are a specific response of the nerve tissue to the chemical agent. The early and persistent drop in cholinesterase activity in the peripheral nerves provides a basis for the use of this indicator as an additional criterion in determining the threshold of harmful influence of chemical substances causing long term neurotoxicity. References 3: 2 Russian, 1 Western.

6508/12955
CSO: 1840/2192

UDC 613.32:547.412.1]-02:628.162.84]

TOXICOLOGICAL ASSESSMENT OF DICHLOROBROMOMETHANE AND DIBROMOCHLOROMETHANE FORMED IN WATER CHLORINATION

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 25 Sep 84) pp 80-82

[Article by A. A. Korolev and A. I. Donchenko, First Moscow Medical Institute imeni I. M. Sechenov]

[Abstract] Toxicological assessment was conducted on dichlorobromomethane (I) and dibromochloromethane (II), which are commonly present in drinking water as a result of chlorination. The LD_{50} values for I on albino mice, CBA X C_{57}Bl mice and albino rats were calculated at 1970, 2360 and 1560 mg/kg, respectively. The corresponding LD_{50} values for II on the same species were 2120, 1830 and 1360 mg/kg. Thus, on peroral administration both compounds were moderately toxic; however, the index of cumulation for I and II had previously been established at 0.4 and 0.3, indicating marked accumulation in the body. In studies on albino rats 1/100 LD_{50} doses of I and II were found to be free of embryotoxicity. Additional studies with long-term administration of I and II demonstrated that, in terms of biochemical parameters, the safe dose limit for both was 0.015 mg/kg. These observations, in conjunction with ongoing studies on the carcinogenicity of I and II, shall be used to establish permissible levels for these compounds in water. References 8: 5 Russian, 3 Western.

12172/12955
CSO: 1840/2177

UDC 613.5:[628.8:615.9](049.2)

HYGIENIC FORECASTING OF TOXIC SUBSTANCE LEVELS IN INDOOR AIR

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 9 Jan 85) pp 58-59

[Article by M. T. Dmitriyev, G. P. Zarubin, and V. A. Mishchikhin, Moscow]

[Abstract] A theoretical discussion is presented of the problem of indoor air pollution, which presently stems largely from polymers. One of the more effective means of preventing such problems is an analysis of possible levels of pollution from the construction materials employed, and the establishment of permissible levels. Such studies entail analysis of fall-off rates with time and, once sufficient data have been collected for the various polymeric materials, table can be constructed from which predictive data can be derived. The establishment of a reliable procedure for predicting air contamination levels would then become the basis for hygienic oversight of indoor air. Figures 1; references 8 (Russian).

12172/12955
CSO; 1840/2178

UDC 614.841.13:615.916:691.175

PREDICTION OF TOXICITY OF POLYMER COMBUSTION PRODUCTS

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 23 Aug 84) pp 20-23

[Article by A. I. Eytingon, Scientific Research Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, Moscow]

[Abstract] Mathematical analysis was employed for the prediction of the toxicity of combustion products of polymeric materials, in order to isolate parameters characteristic of different polymer groups. Five polymeric materials were analyzed, aromatic polyamides, polyurethane foams, styrene-nitrile copolymers, polyvinyl chloride, and fluorinated polymers. The analytical data revealed that the major components responsible for the toxicity of polyvinyl chlorides were hydrogen chloride and carbon monoxide, in the case of aromatic polyamides and polyurethane foams the target agent was hydrogen cyanide; in the case of styrene-nitrile copolymers toxicity was primarily due to carbon monoxide and hydrogen cyanide, and the toxicity of fluorinated polymers on combustion was due to hydrogen fluoride and, to a lesser degree, to carbon monoxide. The mathematical approach to the prediction of toxicity was most suitable and effective when the analysis excluded values corresponding to 100% or zero effect. References 8: 5 Russian, 3 Western.

12172/12955
CSO: 1840/2177

BRIEFS

AZERBAIJAN CONGRESS--The 2d Congress held by the Azerbaijan SSR surgeons on 20-21 May concerned the situation of prompt and specialized surgical help given to people and the prospects of improving it. Talyat Kasumov, minister of health of Azerbaijan SSR, opened the congress. The convocation heard reports on topical matters concerning the improvement of surgery. It also elected the surgeons' new board of the scientific peace association. Professor Nurradin Rzayev, the director of the Institute for Scientific Research and Clinical and Experimental Surgery imeni Topchubashev was reelected chairman of the board. R. Mamedov, chief of the Azerbaijan Communist Party Central Committee Science and Education Institutions Department, participated in the work of the convocation. (Text) (Baku Domestic Service in Azeri 0105 GMT 22 May 86 GF)

/12955
CSO: 1840/1233

NARCOTICS IN GEORGIA: LONG-TERM THEFTS REVEALED; ADDICT CAUGHT

[Editorial Report] Tbilisi KOMUNISTI in Georgian on 19 April 1986 carries on page 4 M. Anasashvili's 1,000-word article about slipshod control and record-keeping practices in Tbilisi's Central Emergency Medical Care Station that enabled an administering nurse over the years to steal and sell large amounts of narcotics intended for home-bound terminal cancer patients. The nurse, Ksenia Dzhgarkava, worked as a member of one of the station's four brigades from 1965 on. When caught, she was in possession of nine ampules of omnopone. At her home were found 20 more of the same, along with 52 ampules of promedole and 283 of other drugs.

The system by which prescribed doses are delivered and administered to registered terminally ill patients is outlined, and the control procedures given in some detail. Doctor Tina Gvilava, head of the oncology department since 1979, was responsible for all phases of control and record-keeping but allowed things to slide. Accordingly, she was charged in court along with Dzhgarkava.

On 25 April, KOMUNISTI carries on page 4 D. Bitsadze's 400-word account of Teimuraz Kupatadze, a railroad worker at the Gardabani Station, who was caught in the possession of a narcotic substance, determined to be an addict, tried and convicted, and sentenced to two years "general regime" with compulsory treatment. Kupatadze led an outwardly normal life, has a wife and small child, and had a good work record. Gardabani ROVD officers checked him out when he acted suspiciously near the grounds of the Tbilisi GRES bazaar and found "a greyish substance wrapped in silver cigarette paper" in his pocket; later examination revealed it to be "hashish." He swore he didn't know what it was or how it got there. When officers questioned him about a scar on his arm he claimed it was from giving blood when his child needed a transfusion.

/12955
CSO: 1840/1232E

CONVICTION NARCOTICS OF FOUR GEORGIAN KOMSOMOL MEMBERS

[Editorial Report] Tbilisi AKHALGAZRDA KOMUNISTI in Georgian on 22 April 1986 carries on page 2 Manana Kartozia's 2,600-word article concerning the case of four men, Komsomol members in their 20s, who were arrested for narcotics possession (opium) at the Kiev airport in July and August last summer and convicted in the Kiev Oblast Borispol Peoples Court; various sentences were meted out. When caught, one of the men, Giorgi Gamkrelidze, was carrying over 10 kilograms, purchased in Lvov, Vinnitsa, and Kiev; the other men were carrying smaller but still substantial amounts.

The article goes into some detail concerning the men's backgrounds, which, though different, have certain key character deficiencies in common. Giorgi Gamkrelidze, whose father Tengiz formerly served as head of ZARYA VOSTOKA's foreigh department [and wrote regular political commentary], had trouble keeping a job, was listed as a Gruzinform stringer for years although he never earned anything at it, and used this "credential" to obtain enrollment in the Chavchavadze Foreign Languages Institute (French), from which he eventually flunked out after a dismal record. The other men tended to drift from job to job, and there are hints of the use of "pull" to get favorable positions. Two of the men got out of military service, one for suspicious "health" reasons and one for "family responsibilities."

A recurring theme of the article is the seeming apathy of the men's parents and friends, the Komsomol organizations, and other institutions bearing joint responsibility. The author also alludes briefly to statistics showing that over 65 percent of narcotics users and dealers in Georgia are between the ages of 18 and 29, and last year the Komsomol contingent among them rose by 16 percent.

/12955
CSO: 1840/1232-E

UDC 617.3-082(47+57

ORGANIZATION OF TRAUMATOLOGIC AND ORTHOPEDIC SERVICES DURING DEVELOPMENT OF VIRGIN LANDS

Moscow ORTOPEDIYA, TRAVMATOLOGIYA I PROTEZIROVANIYE in Russian No 3, Mar 85 (manuscript received 11 Nov 85) pp 62-65

[Article by T. E. Ungbayev, N. D. Dzhabbarov, A. A. Akbarov and E. U. Umbarov, Uzbek Institute of Traumatology and Orthopedics, Tashkent]

[Abstract] In order to provide a rational basis for the development of traumatologic and orthopedic services in those areas of Uzbekistan undergoing development of virgin lands, intensive studies were commenced in 1963 to define all social, clinical and occupational factors pertaining to trauma. One of the most important aspects of administration involved recruitment of medical cadres and provisions of the best in medical technology to create a sound basis for insuring optimal medical care of the workers. As a result of special instructions issued by the Uzbek SSR Ministry of Health the number of traumatologic hospital beds increased 5.5-fold from 1970 to 1980, as against a 2.5-fold increase for surgical beds in general in Kashkadar Oblast. As a result of these and other measures, the incidence of occupational and domestic traumatic cases and incapacity has decreased by 25-30% in the Kashkadar Oblast, proving the need for such services and educational measures in areas with intensive desert irrigation and virgin land development. References 5 (Russian).

12172/12955
CSO: 1840/2215

UDC 613.95:362.7

EFFECTS OF COMBINATION OF ENVIRONMENTAL FACTORS ON HEALTH OF CHILDREN

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 30 Oct 84) pp 33-34

[Article by A. D. Dimitriyev and Yu. D. Sherbin, Sakhalin Oblast Sanitary Epidemiologic Station]

[Abstract] Three settlements in the Sakhalin Oblast selected for a study on the effects of a combination of environmental factors on prevailing health patterns of children in those areas. The factors under consideration included evaluation of air pollution, chemical composition of the drinking water, severity of climatic conditions, etc. The qualitative data demonstrated that an increased incidence of morbidity and developmental lag was directly related to the adverse environment. However, the study also demonstrated that the poorest state of health prevailed in children born to women 29 years old or older. On the basis of these observations, recommendations have been made to improve air quality in the most affected areas. References 3 (Russian).

12172/12955
CSO: 1840/2178

UDC 371.73:612.014.49(571.51-22)

ADAPTIVE POTENTIAL AND PHYSICAL TRAINING OF RURAL PUPILS

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 27 Nov 84) pp 51-54

[Article by L. V. Kiselev, Krasnoyarsk Pedagogic Institute]

[Abstract] A study was conducted in the village of Vysotino in the Krasnoyarsk Kray to assess the adaptive potential and physical training of pupils in an agricultural area. The study involved 10 boys and an equal number of girls, 13-14 years old, attending the 7th and 8th classes. The children were monitored from the 1st to the 210th day of school, a program which includes a 45 min gym class 2 times per week and 1-2 sessions of general physical training. Over the period of the school year both sexes showed improvement in cardiovascular endurance in response to a physical challenge, a fact which also allows for the prediction of physical performance on the basis of regularly scheduled gym classes and their activities. In addition, regular physical activities were found to enhance academic performance, which further confirms the need for such programs at school to ensure the well-being of children. References 10: 9 Russian, 1 Western.

12172/12955
CSO: 1840/2177

UDC 613.95:614.3/.4.07

ANALYSIS OF ACTIVITIES OF DEPARTMENTS OF CHILD AND ADOLESCENT HYGIENE OF MUNICIPAL SANITARY EPIDEMIOLOGIC STATIONS IN CITIES WITH RAYON STATIONS

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 25 May 84) pp 61-63

[Article by G. L. Turovets, Scientific Research Institute of Child and Adolescent Hygiene, USSR Ministry of Health, Moscow]

[Abstract] A discussion is presented on the effectiveness of rayon level sanitary epidemiologic stations as a function of the manner in which they are administered by the municipal sanitary epidemiologic stations. In the sphere of child and adolescent hygiene, the effectiveness of the rayon stations is dependent on the expert assistance provided by the municipal stations and their monitoring of the former's performance. The rayon stations are responsible for an annual analysis of the morbidity dynamics in their area and evaluation of the preventive measures that are in force. They provide the raw data on which city-wide plans are formulated at the municipal stations for implementation at the rayon level according to a unified and standardized plan. Tables 2.

12172/12955
CSO: 1840/2177

UDC 615.2/.3.036.8+615.4.014:658.562

STATE SYSTEM OF DRUG QUALITY CONTROL AND ITS STRUCTURAL ELEMENTS

Kiev FARMATSEVTYCHNYY ZHURNAL in Ukrainian No 2, Mar-Apr 86
(manuscript received 22 May 85) pp 66-69

[Article by O. L. Grom and B. P. Gromovik, State Medical Institute, Lvov]

[Abstract] A functional model was developed for State Drug Quality Control involving all levels of administration in the process of introduction, manufacturing and consumption of new drugs. Five subsystems are envisioned: subsystem I is concerned with introduction, standardization and evaluation of drugs; it fulfills the legislative, coordinating, organization and control functions. Subsystem II assures the quality of drugs during their production and subsystem III is responsible for the same action on the distribution level. Sanitary control is under subsystem IV and subsystem V provides metrological standardization of the end products. In this fashion, control and monitoring of the quality of drugs is assured at all governmental levels. Figure 1; references 15 (Russian).

7813/12955
CSO: 1840/2237

PHYSICAL EDUCATION TO COMBAT ALCOHOLISM

Moscow TEORIYA I PRAKTIKA FIZICHESKOY KULTURY in Russian No 9, Sep 85, pp 37-39

[Article by V. P. Nekrasov, doctor of medical sciences]

[Abstract] Escape from reality through alcoholism and drug abuse is typical of bourgeois society while in the USSR there is no reason for social drinking, the author claims because the Party takes care of the population and its wellbeing. And, yet, alcoholism exists in the USSR. In the pre-revolutionary days alcohol was the only source of happiness. This is not the case now. Now it is the inability to utilize rationally the free time available to everybody. The author believes that physical exercise is a definite answer to alcohol consumption: no active sportsmen turn to alcohol, he claimed. Morning exercise is an especially good way to start the day both physically and emotionally. Walking to work and through the day is another method of continuing physical exercise. Finally, athletes should get involved in educational work for the population at large and in antialcohol propaganda. References 5 (Russian).

7813/12955
CSO: 1840/2221

UDC 616-084.3:616-07

PERIODIC MEDICAL EXAMINATION IN TRANSITION TO ANNUAL MASS MEDICAL SCREENING [DISPANSERIZATSIYA] OF WORKERS

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 20 Feb 85) pp 28-30

[Article by T. K. Morozova and V. A. Potekhina, Novokuznetsk Institute for the Advanced Training of Physicians]

[Abstract] The department of occupational pathology has made a study of the organization and utilization of various forms of periodic medical examination of workers. This article notes a number of organizational problems which need solution in association with the transition to annual dispensary observation of the workers: selection of effective forms of physical examinations considering demographic data on workers and characteristics of the production environment; development of standardized information carriers on which to record the status of production factors; broader utilization of visits by workers to polyclinics to see specialists; determination of forms and methods of collection and processing of data concerning the condition of individual workers and groups of workers; standardization of systems for examination of groups of workers; provision of hardware including automated diagnostic systems to therapeutic and prophylactic organizations in order to allow early diagnosis of disease; development of systems for determining risk factors for the leading diseases considering both production and social conditions as well as demographic factors; study of the influence of individual factors on the development and course of the most common diseases; formation of groups of patients considering health status in order to develop the general principles for working with these groups; and active conduct of medical and social measures for prognosis of health in order to prevent complications and to stabilize disease. The work of mass dispensary observation will require development of every element of the basic physical examination, clarification of the stages of its conduct, standardization of the program of examination to reveal deviations in health and take planned steps for prophylaxis of disease, and rehabilitation of patients.
References 2 (Russian).

6508/12955
CSO: 1840/2192

UDC 614.3/.4.07:65.014(476-25)

ORGANIZATIONAL FORMS OF WORK OF MINSK CITY SANITARY-EPIDEMIOLOGIC STATION

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 2 Jul 85) pp 37-38

[Article by L. V. Kotova and N. V. Shestopalov, Minsk City Sanitary-Epidemiologic Station]

[Abstract] In 1980, work was begun on development of a system of organizational standards regulating the activity of individual specialists and structural subdivisions of city and rayon sanitary-epidemiologic stations (SES). As of now, some 20 organizational standards have been developed for SES. The city SES organizes and leads the activity of all SES within the city. The centralized laboratory monitors the activity of laboratory in departmental SES, scientific research laboratories, design offices and industrial enterprises in the food industry. The sanitary-epidemiologic council plays a great role in organizational and procedural work in the city. A procedures council has been created in the city SES to bring order to the flow of information letters and to improve their quality. The work of the council has had a positive influence on the quality of documents produced by specialists. In 1981, a council on scientific research work was set up in the city SES, which develops recommendations, organizes and monitors the conduct of scientific research work within the city SES system. All young graduates of medical institutes are sent to city and rayon SES for initial work.

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ORGANIZATION OF CONTROL OF SANITARY-EPIDEMIOLOGIC SERVICE IN MINSK

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 25 Jun 85) pp 39-40

[Article by N. V. Shestopalov, Minsk City Sanitary-Epidemiologic Station]

[Abstract] Over the past decade a number of steps have been taken in Minsk to improve the epidemiologic service. The most important measure for improvement of staff and organizational structure was the centralization of administration and financing of the sanitary-epidemiologic service in 1974. The chief state sanitary physician was given complete control of problems of equipping, selection and assignment of personnel and assignment of vehicles. Productivity of labor was increased significantly by centralizing and specializing sanitary-hygienic and bacteriological studies. Improvement of the organization of preventive inspections allowed development of unified tactics for land-use zoning within the city. The organizational department administers the service, receives and distributes streams of information, monitors the implementation of directives from superior organizations and the fulfillment of quarterly and annual working plans. Each year, a number of resolutions and decisions are made by the city and rayon party executive committees intended to improve the health status of the environment, conditions of labor and life of the workers, and control infectious diseases. This has a positive influence on the work of the service.

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UDC 614.3/.4-058

COMPLEX SOCIAL-HYGIENIC STUDIES OF SANITARY MONITORING OF OBJECTS

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 29 Jun 84) pp 69-72

[Article by A. I. Gubin, N. V. Dyachuk, V. A. Dyachuk, V. V. Mazayev, G. I. Nechiporuk, Ye. G. Protsek and N. M. Khomyakova, Vinnitsa Medical Institute imeni N. I. Pirogov]

[Abstract] The sanitary-epidemiologic service must develop new forms and methods for working with objects which they must continually monitor. The introduction of complex examination of social hygienic status requires an improvement in the structure of utilization of workers' time. The first stage is one of making a list of objects to be subjected to complex examination, followed by laboratory and instrumental studies of the conditions of labor at these locations, monitoring of sanitary-hygienic situations and prioritized field studies of objects in dangerous, critical or stressed sanitary-hygienic states. The materials obtained in these complex examinations are used to develop methodologic instructions to improve sanitary-hygienic situations at such locations. At present, the facilities available to the sanitary-epidemiologic station allow complex examination of only a limited number of objects, but application of the method has indicated its expediency and effectiveness for broader use in the future. References 7 (Russian).

6508/12955
CSO: 1840/2192

UDC 614.3/4.07.007

WORK EXPERIENCE OF PERSONNEL IN RAYON SANITARY-EPIDEMIOLOGIC STATION

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 9 Jul 85) pp 64-66

[Article by A. E. Lysyy, Sanitary-Epidemiologic Station of Ternov Rayon, Krivoy Rog]

[Abstract] This report summarizes four years experience in operation of a rayon sanitary-epidemiologic station (SES) in terms of selection, assignment and utilization of personnel and continued education of personnel. The data covers 1981-1984, during which time 95% of physicians billets were filled and 79% of nonprofessional medical personnel billets. The process of bringing young medical institute graduates into the system with ceremony and material stimulus is described. Improvements are called for in the development of criteria for evaluating the work and standardizing the work load of physicians. Analysis of the activity of the SES in the area of communal hygiene over the four year period shows that a significant percentage of working time is spent in the solution of problems of "toilet" sanitation, not requiring special hygienic knowledge. It is suggested that these problems be assigned to other organizations to free up physicians' time.

6508/12955
CSO: 1840/2192

UDC 618.6-082.4:725.51+613.5:725.51:618.6-082.4

HYGIENIC ASSESSMENT OF PLANNING OF POSTNATAL PHYSIOLOGY DEPARTMENTS OF OBSTETRIC HOSPITALS

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 8 Jul 85) pp 63-64

[Article by L. A. Shvetsov, Leningrad Oblast Sanitary-Epidemiologic Station]

[Abstract] Direct contact of neonates with pediatric personnel at maternity hospitals facilitates infection of the children with hospital microflora. A significant decrease in hospital infections among mothers and neonates can be achieved by placing mother and child in a separate cubicle or room. Existing standard documents for planning of obstetric hospitals do not reflect this lesson. Bacteriologic studies of obstetric hospitals including rooms, equipment and personnel as well as patients, showed a decrease in contamination with staphylococcus aureus by a factor of 4-6 where mothers and children were maintained together in separate cubicles. Epidemiologic studies showed that this method of maintenance, with complex measures intended to improve sanitary-epidemiologic conditions, could decrease morbidity in postnatal physiology departments of obstetric hospitals among neonates by a factor of three, among mothers by a factor of two. References 2 (Russian).

6508/12955
CSO: 1840/2192

DOCTOR BYZOV'S DEVICE FOR SPINAL REPAIR

Moscow IZVESTIYA in Russian 17 Apr 86 p 6

[Article by A. Pashkov, Correspondent]

[Abstract] This article relates the development, by Doctor Boris Ivanovich Byzov, of a basically new medical technological solution to the problem of treatment of severe spinal trauma, as a major achievement of Soviet medicine. The idea of the device was modeled after the claws of birds. Semicircular clamps are used to clamp the vertebrae, then with special screws the surgeon gradually straightens the spine. Applying for a patient, Byzov noted prior art and the advantages of his device, in the process noting, of necessity, the disadvantages of the previous device invented by the then Director of the Central Institute of Traumatology and Orthopedics, USSR Academy of Medical Sciences. Byzov's determination led him to seek acceptance for his device in the newspapers after it was denied in scientific journals. The success of the device today is a testimony to his persistence.

6508/12955
CSO: 1840/1185

UDC 614.73+614.876

IMPROVEMENT OF STATE PUBLIC HEALTH INSPECTION IN REGARD TO MONITORING ENVIRONMENTAL RADIOACTIVITY

Moscow GIGIYENA I SANITARIYA in Russian No 11, Nov 85 (Manuscript received 31 Aug 84) pp 26-29

[Article by O. G. Polskiy, V. A. Knizhnikov and E. V. Petukhova]

[Text] One of the most important aspects of the activity of radiological subdivisions of epidemiological stations is monitoring compliance with public health requirements concerned with preventing contamination of the environment by radioactive substances and insuring the radiation safety of the population. The work of radiological subdivisions of epidemiological stations in this area is regulated by the "Instructions on the Work of an Epidemiological Station in the Area of Radiation Hygiene."

The great amount of attention being devoted in our country to the radiation safety of the public made it possible to minimize release of radioactive substances into the environment and exposure of the public to radiation produced by radioactive wastes in the presence of the wide use of nuclear power for national economic purposes. Systematic planned study of the radioactivity of the environment on a countrywide scale began in the early 1960's by practical and scientific research institutions of the USSR Ministry of Health. Radioactive fallout, atmospheric air, soil, water and other environmental objects served as the objects of research.

Intensive atmospheric nuclear testing programs carried out in 1954-1958 and in 1961-1962 caused universal large-scale contamination of the environment by nuclide fragments. Appearance of a stratospheric reserve of long-lived radionuclides owing to atmospheric testing of nuclear weapons caused long-term global radioactive contamination of the environment. As a result the population is additionally exposed to external and internal sources of radiation. Man's external exposure is the product of radionuclides settling to the earth's surface, while his internal exposure is caused by intake of radionuclide fragments, predominantly through the digestive tract [2,6,10,14].

Purposeful study of the degree of contamination of certain basic objects in the environment, of radionuclides of global origin, and of their concentration in the human body by scientific research and practical institutions

of the USSR Ministry of Health, made it possible to obtain, within a relatively short period of time, materials characterizing the radioactive situation in the country resulting from global fallout, to reveal the basic laws governing its formation, and to make the corresponding forecasts. In particular, the results of determining the radioactivity of food, drinking water and human bone tissue as well as measurements of the concentration of radionuclides in the living human body made it possible to assess the dynamics of food contamination and of radionuclide intake with food, to determine the quantity of radionuclides in the human body, and to calculate dose loads experienced by different organs and tissues in the principal segments of the population, with regard for the dominant dose-forming factors (peculiarities of diet, human behavior and so on) [2,6,10,11,13,14].

It was established that radioactive fallout reached its maximum during and a year after intensive test explosions in 1963-1964. The greatest intake of radionuclides into the human body with food was noted in this same period [2,14]. The largest external radiation doses received by individuals were also the product of radionuclides such as ^{144}Ce, ^{106}Ru, $^{95}Zr+^{95}Nb$ and ^{137}Cs settling on the soil surface [1,2,8]. This caused a sharp increase in the annual exposure doses of the public resulting from environmental contamination. In this period, the average individual doses of the population resulting from global fallout were about 7 percent of the average exposure dose from all natural sources. In connection with cessation of atmospheric testing the density of radioactive fallout began to decrease significantly. It was established that the contribution of atmospheric contamination to the radiation dose in products of plant origin--bread in particular--began to decrease correspondingly [2,6,11]. Growth in accumulation of the soil reserves of ^{90}Sr and ^{137}Cs led to an increase in the significance of the soil pathway of radionuclide intake with food; research revealed that this had an effect on the degree of contamination of foodstuffs and on the nature of assimilation of radionuclides by the human body [2,4,14]. The concentration of ^{90}Sr and ^{137}Cs in soil reached its maximum in 1965; a tendency for the radionuclide level to decrease was noted after 1966. In recent years of observations the soil reserve has remained practically unchanged, inasmuch as self-purification of the soil is being compensated by new fallout resulting from explosions in China [1]. Because of the growing role of soil, the rate of decrease of contamination of foodstuffs is inadequate to the degree of decrease of the density of radioactive fallout. As an example between 1964 and 1976 the concentration of ^{90}Sr in the daily ration decreased from 2.7 to 0.84 Bk [not further identified], while that of ^{137}Cs decreased from 12.1 to 0.85 Bk--that is, by approximately 6 and 14 times respectively [2, 13,14]. In the same period of time, the level of fallout in the Northern Hemisphere decreased more significantly, as is evidenced by data of the United Nations' NKDAR [not further identified].

Analysis of many years of data obtained by the radiological subdivisions of epidemiological stations as well as by the Biophysics Institute of the USSR Ministry of Health and by the Leningrad Scientific Research Institute of Radiation Hygiene made it possible to reveal the basic laws governing migration of radionuclides through biological and food chains in different natural and climatic zones of the country, and to reveal the

unique features of their assimilation and accumulation in the human body depending on age, character, diet and the mineral composition of drinking water [2,4,10]. The revealed laws made it possible to conclude that over 90 percent of the radionuclides enter the body with the food ration, 5-9 percent enter with drinking water, and less than 1 percent enter with inhaled air. Grain products were found to play the leading role in total intake of ^{90}Sr and ^{137}Cs with the ration by the population of the USSR, while milk plays the leading role in some specific regions. The significance of these laws ranges beyond the bounds of radiation hygiene. In particular, these laws indicate that for hygienic regulation of industrial atmospheric releases of metals and other toxic substances that remain stable in the environment, it is not enough to account only for their possible intake into the body with inhaled air, inasmuch as the dietary pathway can be of much greater significance.

During the study of the radiation situation caused by global fallout, certain large regions were revealed in the country with specific conditions, such as the Subarctic and the Belorussian-Ukrainian Polesye, where owing to peculiarities of soil and climate and to socioeconomic factors the country's maximum radionuclide intake with food and correspondingly larger dose loads are recorded in the population [2,8,10]. The range of variation of the average exposure doses of large, relatively uniform segments of the Soviet Union's population is insignificant as a rule [1,2]. At the same time in view of certain peculiarities of radionuclide migration through food chains, in specific regions of certain republics (RSFSR, Ukrainian SSR, Belorussian SSR) the doses received by the population are up to 10 times greater than the average for the republic [2,10].

A study of the radiation situation in the last few years (1976-1982) permits the assertion that in the country as a whole, noticeable changes are not occurring in the patterns of food contamination, and there has been a pronounced decrease in the degree of contamination of food rations: It decreased by around 35 percent for ^{90}Sr, and 40 percent for ^{137}Cs. But at the same time in certain periods the level of contamination of the basic foodstuffs (milk, potatoes) was observed to be somewhat stable owing to atmospheric explosions in China and France. Such was the case, in particular, in 1976-1979 and 1981-1982.

As a rule the levels of intake of radionuclides by the human body were determined from data acquired by radiological subdivisions of epidemiological stations on the degree of contamination of individual components of the ration and on the dietary structure of different segments of the USSR population.

The results of analyses of the concentrations of ^{90}Sr and ^{137}Cs in foodstuffs and in drinking water were regularly submitted by the country's epidemiological stations in the form of semiannual reports. The annual volume of information included the results of analyzing not less than 5,000-7,000 samples from environmental objects. Radiological subdivisions of the country's epidemiological stations conducted 15,000 and more radiochemical and radiometric determinations in food products, raw materials, drinking water and human bone tissue annually.

Information on the patterns of migration and metabolism of radionuclides was accumulated and the monitoring methods and the procedures of radiochemical analyses were improved in the course of many years of research. New procedures of public health monitoring of the concentration of radioactive substances were introduced into the work of epidemiological stations, and the objectives of radiological subdivisions of epidemiological stations were refined [6,7,9]. During this time the qualifications of specialists working for epidemiological stations grew significantly. Information obtained on the concentration of radionuclides in environmental objects made it possible to systematically provide data on milk contamination in the USSR to the International Radioactivity Reference Center of the World Health Organization [16].

Successful monitoring of global radioactive fallout and materials objectively reflecting the pattern of contamination of environmental objects and the dose loads experienced by the population owing to ^{90}Sr and ^{137}Cs are making it possible to modify such monitoring in the direction of reducing the amount of surveillance maintained over some foodstuffs and intensifying such surveillance in certain regions having soil permitting more intensive migration of radionuclides or possessing other features creating the possibility of greater exposure of the public.

Research carried out in recent years shows that among the environmental radiation factors, natural radionuclides extracted from the subsoil together with raw materials used to make construction materials and fertilizers as well as with fossil fuels are responsible for the greatest dose load experienced by the public [1,3,5,8,15]. Natural radiation sources create a relatively constant exposure level throughout the entire period of the individual's life. The annual effective equivalent dose resulting from natural radiation sources, including technologically altered ones, averages around 2-2.5 mZw in regions with a "normal" background [15]. But significant deviations from this average level may occur. This dictates the need for widely studying the concentration of natural radionuclides in the environment. In this connection we need to improve monitoring by organs of the State Public Health Inspection.

Optimization of surveillance over environmental contamination with the purpose of obtaining sufficiently complete and dependable information on dose loads experienced by the public owing to artificial and natural radionuclides was the subject of a number of conferences and meetings in recent years, particularly the All-Union Conference on Radiation Hygiene in 1977 (Tashkent) and 1980 (Zaporozhye), organized and conducted by institutions of the USSR Ministry of Health and the Uzbek and Ukrainian SSR.

Acting on recommendations from the Tashkent conference, the USSR Ministry of Health ordered the Uzbek and Kazakh SSR ministries of health to carry out an experimental project to optimize the monitoring of global fallout. Special attention was turned to the need for studying the peculiarities of migration of artificial radionuclides in different areas of the republics and to organizing deeper research on natural radionuclides. These measures involved the need for fuller determination of the dose loads of

the public resulting from the basic dose-forming factors, including technologically dependent action of natural radionuclides and radiation sources, without investing additional assets and manpower of radiological subdivisions of the epidemiological stations.

Publication of directive documents of the USSR Ministry of Health in 1980--attachments No 1 and No 2 to the "Instructions on the Work of an Epidemiological Station in the Area of Radiation Hygiene," No 1900-78--promoted further improvement of the work of radiological subdivisions concerned with protecting the environment from radioactive substances.

An all-union conference in Karaganda (1981) which summarized the results of work done in the Uzbek and Kazakh SSR was devoted to the problems of optimizing the system for monitoring environmental contamination and public health surveillance over the radiation safety of the public. On the whole, the all-union conference on radiation hygiene approved the work carried out by the Uzbek SSR Ministry of Health, and applying the experience of this republic to other regions of the country with regard for local conditions was proposed. In addition to measures for optimizing the monitoring of contamination of the environment by artificial radionuclides, widening research on the natural radioactivity of the environment was recommended.

The widening of the objectives of radiological subdivisions of epidemiological stations in the new stage was reflected in Attachment No 3, approved by the USSR chief state public health physician on 3 August 1982; its introduction into the practical work of the radiological subdivisions of epidemiological stations will make it possible to obtain the needed information on dose loads experienced by the public due to natural radiation sources.

The radiological subdivisions of the country's epidemiological stations are faced today with the task of making a complete determination of the total dose loads experienced by the population within their regions of control as a result of the principal dose-forming factors, including the natural background, and especially the technologically enhanced radioactive background. Anthropogenic irradiation exceeds the natural background of open terrain in "normal" regions by almost three times today (see table).

Considering the significant contribution made by natural radiation sources to the population's dose, the radiological subdivisions of epidemiological stations must conduct systematic research on the radioactivity of construction materials, fertilizers and local coal deposits in the volume foreseen by Attachment No 3.

Among the sources of natural contamination of the environment, global radioactive fallout consisting of fragments produced by nuclear tests continues to make the main contribution to the population's dose. Each new atmospheric test means a commensurate increase in the radiation dose to which the present and future generations are exposed.

Considering the stable nature of environmental contamination by radionuclides of global origin, and particularly the fact that the quantity of long-lived

Irradiation of the USSR Population Due to Some Sources of Ionizing Radiation [1-3,15,18]

Источник (1)	Эффективная эквивалентная доза (2)	
	мЗв/г (3)	мбэр/г (4)
Естественный фон* (5)	0,9	90
Строительные материалы (6)	1,6	160
Рентгенодиагностика (7)	1,4	140
Глобальные выпадения (8)	0,02	2
Выбросы в атмосферу искусственных нуклидов от АЭС (9)	$0{,}1 \cdot 10^{-4}$	$1 \cdot 10^{-3}$
Выбросы в атмосферу естественных нуклидов от ТЭС (10)	$0{,}2 \cdot 10^{-2}$	0,2
Всего (11).	~3,9	392

*Not including irradiation in residential and public buildings

Key:
1. Source
2. Effective equivalent dose
3. mZw/gm
4. millirems/gm
5. Natural background
6. Construction materials
7. X-ray diagnosis
8. Global fallout
9. Atmospheric releases of artificial nuclides by nuclear power plants
10. Atmospheric releases of natural nuclides by thermal power plants
11. Total

radionuclides accumulated in soil will serve as sources of radioactive substances ingested by the human body with food for many years to come, we need to make a fuller study of the radionuclide migration patterns in regions where the soil promotes migration or where it experiences more radioactive fallout (in mountain regions for example). We need to refine all of the migration features of each region in order to achieve an optimum distribution of nuclear power engineering enterprises, and to draw up radiation forecasts.

Control over global fallout must be systematic, inasmuch as the possibility of more test explosions in the open by other countries is not excluded.

The unceasing importance of the problems of radiation hygiene is persuasively illustrated in the table in relation to the growing use of nuclear power sources in the national economy. The table shows that the exposure doses experienced by the public are nearing 0.4 rems (4 mZw). At the same time the existing radiation safety norms (NRB-76) foresee an annual dose limit of 0.5 rems for category B individuals, a limited segment of the population. Thus we find that the standard for certain limited groups has been attained by almost the entire urban population of the country. In our opinion it would be undesirable to exceed this standard. Therefore study of the total loads experienced by individual large segments of the public in different regions of the country as a result of all of the principal sources of ionizing radiation is acquiring special importance.

In light of the tasks facing the radiological subdivisions of the country's epidemiological stations, we need to develop a unified program of surveillance over natural and artificial radioactivity in the environment, with regard for the accumulated scientific and practical information and the generalized work experience of epidemiological stations in this area.

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PRINCIPLES AND METHODS OF USING WILD ANIMALS FOR BIOLOGICAL INDICATION OF GLOBAL RADIOACTIVE CONTAMINANTS

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[Text] Wild animals (mammals, birds, reptiles, amphibians, land and soil invertebrates) accumulate easily recordable quantities of radionuclides in natural ecosystems. Procedures for estimating the concentration of radionuclides in the bodies of animals are examined. Use of wild animals to study biogenic migration of radionuclides through food chains in ecosystems in connection with global monitoring of environmental contamination, especially in biospheric preserves, is proposed.

Introduction

Sharp growth of attention toward the state of man's environment has once again evoked interest in the problem of biological indication. Special sectors of the municipal economy have been created in all of the world's industrially developed countries in order to preserve the environment in a state suitable for human life. The state of the environment is one of the indicators of the population's "quality of life." A new direction of biological indication--control of the state of the environment--began developing successfully in the last decade owing to the sharp growth in the load imposed on living organisms by new anthropogenic factors. Given the continually dwindling biological resources associated with growth of the population on earth, the increasing scale of industrial production and the power of technology, every parcel of land on the earth's surface is of continually increasing value to people. Preventing impoverization of the earth's living cover is one of the most important objectives of nature conservation.

Examining the complex of phenomena which are referred to by a not always scientifically strict but nonetheless comprehensible term--"pollution" of

the biosphere--is another problem of biological indication. These phenomena include effects upon animals, plants and microorganisms caused by physical and chemical agents which had not existed previously as factors responsible for formation and evolution of living organisms. In Ramad's opinion [23] these factors began to manifest themselves noticeably just in the last 40 years (ionizing radiation, industrial pollutants, surfactants, mineral fertilizers, pesticides etc.)--that is, in the time during which their propagation and action became worldwide.

Radionuclides--isotopes or chemical analogues of basic biogenic elements which are readily taken up by animal tissues and which are transferred through food chains--are of greatest interest in regard to solving the problems we are considering here: ^{3}H, ^{14}C, ^{90}Sr, ^{106}Ru, ^{131}I, ^{137}Cs. Study of animals to serve as biological indicators of industrial pollutants imposes the following requirements on such animals [9,18]: high abundance and high metabolism, long life span, intensive reproduction, small individual territory, a sessile form of life, constant contact with the anthropogenic factor under consideration, ease of collection of large amounts of material, sensitivity of the animal to the factor under consideration, and relatively large dimensions allowing convenient anatomical analysis.

Radioactive fission products of uranium and plutonium, especially long-lived ^{90}Sr and ^{137}Cs, (with half-lives of 28.4 and 30 years respectively), which settled to the ground after nuclear weapon tests as well as after processing uranium ore and regenerating spent nuclear fuel, have always attracted the persistent attention of ecologists. It was demonstrated that many radionuclides, including ^{90}Sr and ^{137}Cs, are readily included in biogenic turnover, and that they may be accumulated by animals to clearly recordable quantities; however, these quantities make only a small contribution to the dose received from the natural radiation background, and they do not elicit any proven harmful effects. Terrestrial and soil animals participating in biogenic migration of elements (and artificial radionuclides among them) can serve as one of the biological indicators of pollution of the environment by toxic elements or substances. At the same time presence of a certain quantity of natural radionuclides in all living objects of the biosphere, ones which have been actively included in biogenic turnover, create new possibilities and prospects for field ecology. Use of radionuclides as labels (tracers) makes it possible to determine much more accurately the flows of matter in ecosystems and to clarify trophic relationships between organisms and their productivity.

Global Radioactive Fallout and the Animal World

Maximum radioactive global fallout over Soviet territory was observed in the period from 1959 to 1963. An equilibrium concentration of ^{90}Sr and ^{137}Cs radioactive isotopes established itself for practical purposes following the signing of the Moscow treaty on prohibition of nuclear testing in the atmosphere and on the earth surface in 1963. The quantity of such isotopes settling within a year is approximately equal to the quantity of these isotopes disintegrating (and being washed away by surface water) on the

surface in the same period of time [12,13]. Global fallout distributes itself over the entire surface of the earth, but the highest levels are noted at moderate latitudes, which is explained by features of the atmosphere's general circulation [7]. In 1975, average accumulation of ^{90}Sr in soil in the USSR was 41 microcuries per square kilometer, and it was 67 microcuries per square kilometer for ^{137}Cs [15].

Depending on the conditions under which atomic explosions occur, from 50 to 100 percent of the ^{90}Sr formed as a result exists in water-soluble form, and is consequently available to plants and animals. In a period of intensive radioactive fallout from the atmosphere, the principal pathway by which ^{90}Sr and ^{137}Cs enter vegetation is surface contamination of the latter during the vegetative period. Intake of these radionuclides from soil via the root system is insignificant in this period [1,16]. With time, as the intensity of radioactive fallout from the atmosphere decreases dramatically, the soil pathway of entry of ^{90}Sr and ^{137}Cs accumulated in the upper soil layer into plants becomes dominant [19]. Radionuclides may exist in soil in water-soluble, metabolizable or nonmetabolizable states, which is what determines their subsequent behavior on the earth surface, and which explains the patterns of their distribution and redistribution in soil and in the soil-plant system, and their subsequent uptake and accumulation by animal tissues.

Radioactive isotopes enter the bodies of terrestrial animals chiefly by the alimentary pathway--with food and water, as well as by inhalation of radioactive aerosols or gases. But we cannot ignore some other radioactive isotope entry pathways such as absorption of particles of contaminated soil and their swallowing by animals during grooming. Nor is the possibility of intake of radionuclides into the organism by terrestrial animals by means of diffusion through the body surface excluded. This pertains especially to amphibians and to some invertebrates inhabiting the soil. Accumulation of radioactive isotopes by animals is proportional to the density of contamination of the ecosystem by radioactive decay products, particularly ^{90}Sr and ^{137}Cs. This was noted for example in relation to deer from different herds in Alaska: Depending on the density of contamination, the concentration of ^{137}Cs in muscles varied by a factor of 3-10 [34].

The concentration of radioactive isotopes in the bodies of animals also varies depending on the intensity of global fallout, which is in turn determined by the quantity and yield of nuclear explosions. In this case the delay of the maximum concentration of ^{90}Sr and ^{137}Cs in animal tissues in comparison with the time of maximum fallout is from several months to 1 or 2 years [32]. It should be noted that the relative availability of radioactive fission products formed by nuclear explosions to animals depends significantly on the type of fallout with which they settle to the ground. It is usually much harder for animals to assimilate fission products making up so-called local fallout than global fallout. This is apparently explained by the fact that in a zone of local fallout, significant quantities of these decay products are incorporated (immured) into particles of recrystallized dirt. It was demonstrated that the concentration of ^{90}Sr in the bone tissue of rabbits inhabiting a zone directly adjacent to the region of a nuclear

explosion was for practical purposes only a little higher (and often significantly lower) than the level of contamination of animals inhabiting areas extremely far away from the regions of nuclear explosions and whose bodies were contaminated only by global fallout [20].

Migration of ^{90}Sr and ^{137}Cs from global fallout through food chains involving wild and domesticated animals and leading to man were studied most intensively in our country in the Far North. The necessity of such research was predetermined by the factor that the concentrations of radionuclides in links of the lichen→reindeer→man chains exceed those in similar links of other chains and other regions by 10-100 times [17]. Clearly pronounced seasonal fluctuations in the concentration of ^{137}Cs in reindeer muscle were noted in this case. The concentration of ^{137}Cs is 15-18 times higher in winter than in summer. A similar pattern is observed in Alaska and in Sweden [16,24,34].

Sharply pronounced seasonal fluctuations in the specific radioactivity of ^{137}Cs in venison can be explained by two factors: 1) significant seasonal change in the level of radioactive contamination of feed (in spring, summer and fall reindeer exclude lichens from their diet practically completely, while in winter they feed chiefly on lichen, which selectively concentrates ^{137}Cs from global fallout); 2) the short biological half-life of a radionuclide in the reindeer body--21-35 days. Seasonal fluctuations in the concentration of ^{137}Cs have also been noted in the red deer Cervus elaphus, the noose Alces alces and the roe deer Capreolus capreolus, which inhabit the central zone of the USSR [11].

More-intensive accumulation of ^{137}Cs and ^{90}Sr by animals living at high altitude is indicated in many works. Significant precipitation and concurrent global fallout of ^{90}Sr and ^{137}Cs are typical of such regions.

Contamination of the body surfaces of animals, especially birds, by radionuclides settling directly from the atmosphere has been observed in periods of intensive global fallout of radioactive substances following nuclear weapon tests. A direct dependence was discovered in this case between the dimensions of birds and the quantity of radioactive isotopes on their skin and plumage; certain differences were also noted in the degree of contamination of plumage associated with differences in the time spent on feeding. The skin and plumage of birds that spend a great deal of time in the air was found to be contaminated more intensively by radioactive substances than that of birds spending more time in vegetation [39].

Analysis of published data would show that little research has yet been carried out on the participation of animals in the processes of accumulation of ^{90}Sr and ^{137}Cs from global fallout and on biogenic migration of these radionuclides through terrestrial ecosystems. Practically no research has yet been conducted on soil and land invertebrates, which represent 90-95 percent of the zoological biomass on land.

When we analyze the patterns of accumulation of radioactive isotopes by animals, we must clarify species-specific differences in the concentrations of radioactive substances. These difference may be associated with

physiological features of the organisms, with their morphology or specific feeding habits, their behavior, the distribution of populations in the ecosystem and so on. Terrestrial animals can be divided into the following zoogeochemical groups depending on the nature of accumulation of certain chemical elements, including radioactive ones: 1) accumulators, which contain larger concentrations of the element under consideration than its quantities encountered in the dietary substrate (a concentration factor greater than 1); 2) dispersers, which contain the element in a concentration identical to that of the dietary substrate (a concentration factor of around 1), but which promote intensification of biogenic circulation and dispersal of the element in space through their migration or burrowing activity; 3) purifiers, which contain the element under consideration in a lower concentration than the dietary substrate (a concentration factor less than 1) and promote removal of the element from the food chain [9].

Isotope and nonisotope carriers have a great influence on the concentration of radionuclides in organs and tissues as they migrate through different trophic levels. In chemistry, a carrier is defined as a weighable quantity of an element with which an "unweighable" quantity of another element is accompanied in chemical reactions. An isotope carrier is a stable isotope of a given element, the chemical properties of which are identical to that of its radioactive isotope (for example ^{31}P and ^{32}P). A nonisotope carrier is a stable isotope (or isotopes) of the chemical analogue of an element similar to the radionuclide only in relation to group chemical properties (for example Ca is a carrier in relation to ^{90}Sr , or ^{39}K is a carrier in relation to ^{134}Cs and ^{137}Cs).

Features of Radionuclide Accumulation by Animals in Different Taxonomic Groups

Methodological difficulties in determining the chemical composition of most land animals and their role in biogenic circulation have existed for a long time. Recently developed methods (gas and ion-exchange chromatography, atomic adsorption and neutron activation analysis) make it possible to quantitatively determine up to 30 elements in the bodies of terrestrial animals including tiny ones such as protozoans, mites, springtails and enchytraeids. It was found that organisms that concentrate particular elements are practically not encountered among terrestrial animals (calcium concentrators are an exception), in contrast to aquatic animals, among which there are strontium, vanadium and silicon accumulators. The concentration of water is also somewhat lower in the tissues of terrestrial animals, though on the whole the composition of macroelements found in aquatic and terrestrial animals is rather similar [22]. But the concentration of microelements in animals varies within wide limits, depending on their concentration in food. It was established that as the atomic number of the element increases, the dependence on its concentration in food rises. It should be considered in this case that in contrast to plants or microorganisms, animals absorb only mobile forms of elements, and consequently the concentration of microelements within them reflects the actual level of contamination of ecosystems. Mobile forms of these elements are precisely what determine the dose loads imposed on living organisms and the danger of toxicants to the ecosystem, and not their overall

concentration in the ecosystem. This makes it possible to use wild animals as indicators of ecosystem pollution.

Let us examine accumulation of ^{137}Cs from global fallout on land by different groups of animals as an example. A vast literature is devoted to biogenic migration of ^{137}Cs. Interest toward this element is a product of more than just the fact that this is a long-lived radionuclide and one of the principal agents of radioactive contamination of the biosphere. We know that ^{137}Cs migrates via trophic chains to man through animals and through food products of animal origin. Cesium is chemically similar to potassium, with which it migrates through the food chain. More indicative than the concentration of ^{137}Cs per unit mass of an animal or a plant in relation to studying migration of this radionuclide is the Cs/K ratio. But the animal community as a whole and the role of invertebrates in migration of ^{137}Cs have not been illuminated in the literature.

Despite the high mobility of ^{137}Cs, the principal place in the ecosystem where the element is found is the soil, which can concentrate up to 92-94 percent of this radionuclide with time [27]. In order to study trophic relationships of soil microfauna, which sometimes process up to half of all forest litter annually, Coleman [27] grew a fungal mycelium in a medium containing ^{134}Cs or ^{65}Zn, and then he buried the labeled mycelium 2-3 cm deep in idle land. It was found that grain mites of genus Tyrophagus, armored mites Zygoribatula, Oppia and endeostigmates, all of which are apparently mycetophages, accumulated radionuclides in large quantities from the very first week of the experiment. Radioactive isotopes were found sporadically, irregularly and in low concentrations in the armored mites Tectocepheus and Peloribates; larger quantities of radionuclides were discovered in the predatory ticks Rhodocarus and other mesostigmates. There were groups in which radionuclide labels were absent or detected rarely and in very small quantities: springtails, immature centipedes and fly larvae. Obviously not all of them were consumers of fungal mycelia and of organisms feeding on the latter. Experimental contamination of a meadow plot by ^{137}Cs in the USA revealed that the concentration of the radionuclide in the plot was significantly greater in dead plant remains than in living plant tissues [31]. What we encounter here is the well studied phenomenon of microbial immobilization of ash elements, including radionuclides, in organic remains and in the upper soil horizon, since microorganisms absorb and bind a significant proportion of mobile ash elements. Release of these elements from their bound state and their inclusion in biogenic turnover are promoted chiefly by the activities of soil animals, which break down organic remains and digest a significant proportion of the microbial biomass, transferring ash elements into a mobile state accessible to higher plants [21].

In the mountain ranges of the northeastern USA, in the state of Georgia, where the concentration of ^{137}Cs is three to five times greater in the ecosystems due to global fallout than in surrounding regions, the patterns of migration through food chains were noted to be the same as in places contaminated by this radionuclide [28].

Higher accumulation of ^{137}Cs by lichens did not have any kind of effect on its concentration in invertebrates, which make practically no use of lichens

in their diet. The concentration of ^{137}Cs fell consistently in the course of its migration through the food chain. The absolute quantity of cesium (per unit dry matter) in plants and in the tissues of herbivorous animals and predators in this and in a number of other regions of the USA had a ratio of 5:2:1. The ratio of cesium (in picocuries) to potassium (in milligrams) per unit dry weight was: different species of lichens--19-85; mosses--9-13; higher plants--1.2-5.8; herbivorous insects--0.3-1.2; predators--0.7-1.1.

The concentration of ^{137}Cs in soil, plants and animal tissues was of the same order of magnitude in desert and light sierozem beneath natural vegetation in southern Turkmenistan (microcuries per kilogram dry weight): above-ground portion of plants--$(1-4)\cdot10^{-3}$, pistachio roots--$8\cdot10^{-2}$, onager bones--$5\cdot10^{-3}$, different species of reptiles--$1\cdot10^{-3}$-$5\cdot10^{-2}$, darkling beetles--$5\cdot10^{-3}$-$2\cdot10^{-2}$, dung beetles and dung--$(0.5-4)\cdot10^{-3}$, lepidopteran caterpilars--$1\cdot10^{-3}$. The indicators are all low, especially if we consider that they are calculated in relation to dry weight, and that the ash content of desert animals is rather high.

Research on wild terrestrial vertebrates in the USSR [3,6] showed that in all links of the food chain the ^{137}Cs concentration factor is less than 1 [3,6]. Thus in insects serving as food for birds it was 1.6 in relation to vegetation, for insectivorous birds it was 0.48 in relation to insects, and it was 0.5 in all other food chains in which birds were present [5].

Assimilation of ^{137}Cs by soil isopod crustaceans (wood lice) was 70-87 percent of its concentration in digested food; food assimilation was 1.5-3.5 percent of animal weight per day; the half-life of ^{137}Cs in four studied species of wood lice was 16.8-30.7 days [40]. Because of the low metabolic activity of wood lice and their weak accumulation of alkaline elements, wood lice cause recycling of 2.4-3.3 percent of the ^{137}Cs contained in plant litter serving as their food.

The role of accumulation and migration of ^{137}Cs in soil was studied in experiments with three species of earthworms (Octolasium lacteum, Eisenia hortensis, Lymbricus terrestris) [29]. The earthworms were fed leaf litter labeled with ^{134}Cs, and they were maintained in soil containing ^{137}Cs. Relatively low assimilation of ^{137}Cs by worms from food was detected (percent): O. lacteum--11.6; E. hortensis--25.4; L. terrestris--28.5 (in 24 hours). The bulk of the radionuclide contained in food passed through the intestine unassimilated, and was eliminated in an average of 5.8 hours. The assimilated fraction of ^{137}Cs was also released from the body rather quickly. The half-life was 117 hours in the first species and 67 and 48 hours in the second and third respectively. Worms did not assimilate ^{137}Cs incorporated into mineral soil particles at all. Hence it is clear that worms differ dramatically from insects and other arthropods, which assimilate almost 100 percent of the ^{137}Cs from digested soil.

Very high assimilability of ^{134}Cs and ^{42}K was discovered among spiders, which feed on the tissues of their insect prey, liquefied and partially digested by enzymes in their venom: up to 84-100 percent of the concentration of radionuclides in food. The half-life of ^{137}Cs in spiders of all analyzed species

exceeds 30 days at 20° and 35-51 days at 15° [37,38], which is also associated with the high assimilability of their food. A clear tendency toward reduction of the half-life in small forms and its growth in large forms manifests itself in this case. The data of these experiments agree well with the results of field observations carried out on ^{137}Cs from global fallout in natural broadleaf forests in the USA.

In poikilotherms, the level of accumulation of ^{137}Cs depends strongly on temperature. Thus for insect larvae it is not more than 5 percent of the concentration of radionuclide in food at 5°, up to 11 percent at 15°, and up to 24 percent at 25°. The half-life is 4-5 days, which does not exceed the usual half-life of microelements in insects.

The biological half-life of ^{137}Cs in the principal groups of soil invertebrates--wood lice and diplopod myriapods--is around 30 days at the temperatures at which these animals are encountered in nature. This obviously explains the month's delay in the phases of change in the concentration of the radionuclide in different links of the food chain: Growth and reduction of the concentration of ^{137}Cs in herbivorous insects are observed a month later than in the plants serving as their food, and the same occurs with predatory insects in relation to their food [30].

A significant quantity of papers have now been published on detailed studies of the uptake of radioactive isotopes of cesium and strontium by different species of invertebrates, on their distribution in different organs and tissues, and so on. For the most part these experiments were carried out on laboratory and agricultural animals. Research conducted on wild animals in natural conditions shows that uptake and distribution of radionuclides in them follow the same patterns of distribution and migration as do the analogous elements. The concentration of ^{90}Sr in the skeletons of sheep and black-tailed deer Odocoileus nemionus in California (USA) differed despite the fact that these animals used the same grazing grounds [26]. The authors associate this with differences in their feed rations. The concentration of ^{137}Cs in samples of muscle tissue taken from red deer Cervus elaphus, roe deer Capreolus capreolus and moose Alces alces was 3, 10 and 20 times greater than in cows from the same area [2,11]. Differences are noted in the concentration of ^{137}Cs in the meat of foxes Vulpes fulva, wolves Canis lupus and deer Rangifer tarandus inhabiting the same areas. The concentration of the radionuclide in carnivorous predators exceeds that of herbivorous animals by a factor of 2-3 [33].

And so, growth of the concentration of the radionuclide as it moves through the food chain occurs when concentrations are calculated with respect to the organs that are critical for the given radionuclide. But if the concentration calculations are made in relation to noncritical organs, transfer of the radionuclide is accompanied by significant reduction of its concentration.

Methods of Estimating Accumulation of Artificial Radionuclides by Terrestrial Animals

First of all we need to distinguish between the concepts "content" and "concentration" of a radionuclide in an organ. Content is the quantity of a radionuclide in the entire organ, and it is expressed in fractions per organ, while concentration is the quantity of radionuclide in an organ by weight, usually expressed in microcuries (μCi) or becquerels (Bc) per kilogram of wet tissue. When an element undergoes prolonged dosed intake by the body, after a certain time interval it accumulates in the organ in a quantity that is a multiple or a fraction of the daily dose. Then its concentration in the organ is expressed as the accumulation ratio--that is, as an amount indicating how many times the concentration of the radionuclide in the organ exceeds the daily introduced dose, or what fraction of the latter it is. As an example if by the end of the experiment the organ contains 216 percent of the daily dose, the accumulation ratio would be 2.16. The accumulation ratio can be determined using the formula

$$K = \frac{Cp \cdot m}{q},$$

where Cp--concentration of the element in organs and tissues, m--mass of the organ or tissue (kg), q--quantity of the element entering the organism daily.

The maximum ratios of accumulation of ^{90}Sr in the skeleton and muscles of agricultural animals established in experiments in relation to a normal concentration of calcium in the ration may be used to predict and calculate the maximum permissible level of intake of ^{90}Sr into meat at a known concentration of the radionuclide in the ration. These calculations are carried out using the formula

$$A = \frac{C_f \cdot m}{K}.$$

Here A--maximum permissible concentration of the radionuclide in the animal's ration (μCi); C_f--average permissible concentration of the radionuclide in the food product (pCi/kg); m--mass (bone or muscle tissue) of the food product (kg); K--ratio of accumulation of the radionuclide in the skeleton or muscles.

Thus the accumulation ratio can be accurately established only by experimentation, when the dose load of the radionuclide in the ration is known. When we must study concentration of radionuclides by animals located at different trophic levels in natural conditions, we use the accumulation factor--the ratio of the concentrations of the radionuclide in the organism and in the environment. Calculations of this sort are convenient to comparing the quantity of radionuclides accumulating in plants living under certain environmental conditions. However, their use is limited when it comes to studying accumulation of radioactive isotopes in the bodies of terrestrial and aquatic animals. This is especially typical of radionuclides of artificial origin, which enter the ecosystem sporadically--for example as a result of nuclear weapon tests. In this connection the concentration of the radionuclides under consideration gradually changes in different components of the ecosystem;

moreover these changes occur at different rates in different ecosystems and different components of an ecosystem, and they may even proceed in opposite directions. This is why concentration factors calculated in relation to artificial radionuclides can also vary with time [25].

The nature of the diet and of metabolism and other factors affect the concentration factor [4]--that is, it is a general characteristic of many processes, and changes in it may be given so many interpretations that use of this indicator to describe migration processes sometimes becomes meaningless. At the same time the concentration factors calculated for any component of an ecosystem in relation to any other component would assume fully definite values irrespective of the source of intake of nuclides into the object of analysis.

The transfer of elements out of the environment into the organism and back usually depends on a series of physiological reactions characterizing different stages of such transfer, and when we study biological systems in detail, we must determine the extent to which we must discriminate between these individual stages. The discrimination factor K_d was proposed for this purpose. Special names are applied to K_d in order to indicate which physiological process it is describing. For example $K_{d_{kidneys}}$ indicates the contribution transfer of Sr^{2+} and Ca^{2+} ions through kidneys makes to overall discrimination between these ions in the organism.

The term "discrimination factor" is often used as a synonym of the concept "observed ratio" (OR). But this is incorrect, because the OR associated with transition of analogous elements from one phase to another is the product of the discrimination factors of the different stages in the process of transfer of these ions. Therefore the observed ratio is expressed as follows: $OR=(K_{d_1}((K_{d_2})...(K_{d_p}))$. The reciprocal of the OR is called the protection factor. It characterizes the degree to which the relative content of the radionuclide decreases as it moves through migration pathways. The levels of radioactive contamination of plants existing as one of the first links in a food chain are determined in general form as the result of assimilation of radioactive isotopes by the root system of plants in the course of their mineral nutrition, and of direct contamination of vegetation by radioactive fallout . Depending on the chemical nature of the radioactive isotopes, their half-life and biological features of the plants, the contribution of each of the contamination pathways may vary. Therefore the contributions made by the two pathways of contamination to subsequent links of the chain may differ as well.

For global radioactive fallout characterized by prolonged action, the effect of both contamination pathways on inclusion of radioactive isotopes in agricultural products can be expressed by the relationship $C=K_s \cdot S+K_a \cdot d$, where C--concentration of the radioactive isotope in the food product, S--cumulative content of the radioactive isotope in soil, d--intensity of fallout of the radioactive isotope, K_s and K_a--correspondingly empirical soil and air proportionality coefficients. K_s is expressed in units of concentration of the radioactive isotope in a plant sample per unit density of contamination of the soil by the given radioactive isotope, pCi/kg air-dried matter/mCi/km^2. For ^{89}Sr and

^{90}Sr, it depends at a given density of soil contamination chiefly on the concentration of metabolic calcium in the soil, which is determined by the type of soil. To calculate K_s we would best use Klechkovskiy's formula [8], which relates the concentration of ^{90}Sr in plant products to the density of contamination of soil and to the concentration of stable calcium in soil and vegetation:

$$C=\frac{K\cdot Ca_p\cdot S}{Ca_s},$$

where C--concentration of ^{90}Sr in the plant sample (pCi/kg air-dried matter), Ca_p--concentration of Ca in the plant sample (gm/kg air-dried matter), Ca_s--concentration of calcium in the soil sample (milligram-equivalents per 100 gm soil), S--density of contamination of soil by ^{90}Sr (mCi/km^2), K--normalized contamination factor depending on the type of vegetation. This formula makes it possible to express K_s in the form

$$K_s=K\frac{Ca_p}{Ca_s}.$$

As we can see from this relationship, the size of coefficient K_s depends on the concentration of Ca^{2+} in the plant sample and in the soil--that is, on their types.

A method for determining possible accumulation of ^{90}Sr in plants using a complex indicator (CI) proposed by Klechkovskiy [8] deserves attention. We determine the CI by dividing the concentration of ^{90}Sr by the quantity of metabolic calcium, after which we divide the quantity of strontium units (SU) (1 SU=1 pCi ^{90}Sr per gm Ca) in plants by this value. As a result of transformations the equation assumes the following form:

$$CI=\frac{\text{SU in plants}\cdot\text{Ca, mg-equiv per 100 gm soil}}{^{90}Sr,\ mCi/km^2}.$$

We find the sought value by multiplying the CI by the ratio between ^{90}Sr and ^{40}Ca. It should be considered that this method is not without its faults either. Given an identical concentration of metabolic calcium in soil but different concentrations of potassium, humus and fine particles, significant differences are observed in accumulation of ^{90}Sr by plants.

Conclusion

Use of such animals as biological indicators of global fallout of radionuclides, correct evaluation of the role of animals in biological cycling of elements, and the possibility of modeling this process depend in many ways on consideration of the factors influencing accumulation of elements in organisms and their migration through food chains in an ecosystem. The term "observable ratio," which expresses total discrimination, which in turn characterizes movement of these elements from the source into the biological

system, was introduced in order to establish the mutual relationships between the $^{90}Sr/^{40}Ca$ or $^{137}Cs/^{39}K$ ratio in the biological system and the ratio of these ions in the source from which they enter the biological system.

In recent years biospheric preserves have become the principal base for integrated ecological research on global variations of the environment. Radioecological experiments must also be carried out in biospheric preserves, inasmuch as only in them can the animal world be studied today on the background of comprehensive study of natural ecosystems.

Despite the fact that a vast literature has been devoted to radioecology, migration of elements through food chains and the patterns of this process have not yet been clarified to a degree sufficient to permit construction of models of the migration of a given element through the trophic network of an ecosystem. In the opinion of radioecologists [35], this would require clarification of the features of the transfer of elements from one trophic level to another, the factors responsible for concentration of elements in the organism, and the degree of retention of elements by the organism.

One of the important but poorly studied factors of migration of minerals in food chains is the mutual influence of elements undergoing concentration in the organism. Although ^{40}Ca is a nonisotope carrier of ^{90}Sr, certain competitive relationships do exist between them, expressed as predominant assimilation of ^{40}Ca at the expense of ^{90}Sr, and relatively greater elimination of ^{90}Sr from the organism. This is why ^{90}Sr exists in a somewhat different ratio with ^{40}Ca in an animal's skeleton than in the feed from which it comes, and when it undergoes transfer from feed into the animal's organs, it in a sense protects the organism from ^{90}Sr--that is, discrimination against ^{90}Sr occurs.

However, if we wish to establish the general distribution patterns we would need to consider the largest possible number of species pertaining to different trophic and taxonomic groupings. Thus if we want to try to use wild animals as biological indicators of global fallout of artificial radionuclides, we would need information on the concentration of radionuclides in the most diverse groups of wild animals, as well as standard indicators adopted in radioecology which objectively describe migration of radionuclides through food chains in ecosystems.

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11004
CSO: 1840/2235

UDC 613.648-07

ADDITIONAL COMMENTS ON ICRS COMMUNICATION NO 26

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 18 Oct 84) pp 63-64

[Article by I. B. Keirim-Markus and F. K. Levochkin]

[Abstract] ICRS (International Commission on Radiological Protection) communication No 26 has elicited many comments in that allowable lifespan radiation exposure set by the ICRS entails considerable health risk. In many cases, the allowable exposure levels exceed the permissable exposure limits established in the USSR when the tissue distribution of radionuclides is considered, taking into account the different predilections of the various radioisotopes for different tissues. Only in the case of a uniform distribution of a radionuclide through the body would the permissible dose not be exceeded. Obviously, much further discussion is required before the recommendation of ICRS No 26 can be accepted or modified, since they would involve considerable restructuring and rethinking of presently established safety standards. Tables 1; references 6 (Russian).

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DISTRIBUTION OF MO-99 AMONG SERUM PROTEINS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 85
(manuscript received 20 Jul 84) pp 85-87

[Article by N. S. Shvydko, D. K. Popov and V. I. Shishenina, Leningrad Scientific Research Institute of Radiation Hygiene, RSFSR Ministry of Health]

[Abstract] In vivo and in vitro studies were conducted to determine the distribution and binding of Mo-99(VI) and Mo-99(V) among serum proteins. Incubation studies with human and bovine sera, and tail vein injections into mice of either Mo-99(VI) or Mo-99(V) or of both provided equivalent information that only Mo-99(V) is bound to serum proteins. Under the in vivo and vitro conditions approximately 60% of the Mo is bound to 60,000-90,000 MW proteins, and some 40% to macroglobulins and high MW lipoproteins. There was no binding of MO-99(V) to gamma-globulins. Mo-99(V) appeared to evidence the highest affinity for the macroglobulins, and to a lesser degree for albumin. The marked reduction in the bound fraction after 48 h of serum storage under refrigerated conditions was attributed to the oxidation of Mo(VI) and its dissociation from the proteins.

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SAMPLING DEVICES FOR HYGIENIC STUDIES OF SOLID RADIOACTIVE WASTES

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 7 Aug 85) pp 54-57

[Article by R. Ya. Maslovskiy, S. N. Demin and A. I. Mamin]

[Abstract] A multi-year experiment involving creation and application of various sampling devices for sanitary-hygienic studies in the stages of collection, transportation and storage of solid radioactive wastes is described. Contamination of the air with radioactive nuclides during handling of radioactive wastes was studied by an aspiration method using a number of sampling devices. An installation based on a gasoline motor and a type 30TSS-48 fan showed good results in determining radioactive contamination of the air in the operations of loading solid wastes in open areas and unloading at depositories. Photographs illustrate a high throughout aspiration device carried on a small trailer behind a van and a hand-powered-fan-based aspirator for collection of radioactive substances from ground surfaces. Hygienic studies under the specific conditions characteristic of radioactive waste handling operations require the creation of a number of original sampling devices, which have been produced and successfully used over a number of years. Figures 2, references 12 (Russian).

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UDC 613/636:613.155.13]:636

NEED FOR REGULATING LEVELS OF BACTERIA IN INDOOR AIR AT STOCK-BREEDING COMPLEXES

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 85
(manuscript received 9 Oct 84) pp 79-80

[Article by A. I. Olefir, Kiev Scientific Research Institute of Labor Hygiene and Occupational Diseases]

[Abstract] Bacterial levels in indoor air at stock-breeding complexes have been reported to range from 2×10^4 to $2 \times 10^6/m^3$, depending on the size of the facility and the kind of farm animals that it harbors. By and large, the bacterial flora in the air at such locations consists of saprophytes and aerobic sporogens. The human health hazard stems from the fact that many of the bacteria or bacterial metabolites serve as allergens and have been reported to induce sensitization in up to 35% of the personnel working with animals under such conditions. Particularly troublesome in regard to sensitization have been such species as Bacillus mesentericus, B. subtilis and Proteus vulgaris. These observations point to the need for hygienic standards to set permissible levels of bacterial air contamination in the situations under discussion. It is a problem that should be addressed by the sanitary physicians employed in the agricultural setting. References 7: 3 Russian, 4 Western.

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UDC 613.6+614.7:636

HYGIENIC STUDIES IN ANIMAL HUSBANDRY

Moscow GIGIYENA I SANITARIYA in Russian No 2, Feb 86
(manuscript received 14 Jun 84) pp 30-33

[Article by V. G. Tsapko and V. A. Prokopov, Kiev Scientific Research Institute of Labor Hygiene and Occupational Diseases; Kiev Scientific Research Institute of General and Communal Hygiene imeni A. N. Marzeyev]

[Abstract] There are over 2000 large animal-farm complexes in the Soviet Union, and their number increases each year. Unfavorable production factors at such farms include climate, noise, ammonia and hydrogen sulfide in the air, plus biological agents including bacterial and fungal flora, bacterial endotoxins, epithelial products of animal origin and antibiotics. Hygienic standardization of biological agents is an important scientific problem related to labor hygiene at such farms. Industrialization of animal husbandry and production of liquid fertilizer from manure require the development of methods to determine permissible loads on sewage purification structures, concentrations of substances in the environment and protection of the surrounding rural area from contamination. Animal farms are the largest sources of contamination of the atmosphere, soil and water in rural areas, quite comparable in scale of pollution with large industrial plants. References 16 (Russian).

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UDC 616.99:061.3(47+57)"1985"

5TH ALL-UNION ACAROLOGICAL CONFERENCE IN FRUNZE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86, pp 87-88

[Article by V. N. Kryuchechnikov, Moscow]

[Abstract] The 5th All-Union Acarological Conference was held in Frunze on May 20-23, 1985, at the Institute of Biology of the Kirghiz SSR Academy of Sciences. The conference was attended by 148 specialists from 48 cities, and consisted of 76 papers being read and 50 poster presentations. The proceedings of the meeting were published before the conference by the Kirghiz SSR Academy of Sciences. The conference concentrated on research in theoretical and applied acarology, with the medical session on "The Medical Significance of Ixodid Ticks" attracting the largest number (50) of attendees. The conference concluded with the resolution to hold the 6th conference in Ashkhabad at the Institute of Zoology of the Turkmen SSR Academy of Sciences.

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CSO: 1840/2256

UDC 567.89+616.99]:001:061.3(47+57)"1985"

JOINT INTERDEPARTMENTAL SESSION ON ADVANCES IN SOVIET PARASITOLOGY (MAY 28, 1985, MOSCOW)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 86, pp 88-90

[Article by B. A. Astafyev, Moscow]

[Abstract] The joint interdepartmental session involved the Department of General Biology of the USSR Academy of Sciences, the Department of Veterinary Medicine of the All-Union Agricultural Academy, and the Department of Hygiene, Microbiology and Epidemiology of the USSR Academy of Medical Sciences. The purpose of the session was to update recent progress in parasitological science in the USSR and to set guidelines for future advancements. A number of speakers underscored the importance of close cooperation and sharing of resources among the various academies, particularly when it comes to the control and prevention of zoonoses. Need was also expressed for more scientific meetings devoted exclusively to parasitology, as well as for greater efforts to be made to recruit promising students into the field of medical parasitology.

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UDC 612.8

CONTROL OF BIRD BEHAVIOR. BIOACOUSTIC REPELLENTS AND STIMULATORS

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 4, Apr 86, pp 55-61

[Article by Doctor of Biological Sciences V. D. Ilichev]

[Text] The scientific-technical revolution has affected different aspects of human ecology, including man's mutual relationship with the animal world, and particularly with birds: In the last decade these relationships have grown more complex, and they have become especially acute and challenging.

The number of airplane collisions with birds has increased dramatically--it exceeds 4,000 per year. Birds destroy up to 15 percent of the world's cereal crop yield, and up to 50 percent in some African and Asian countries. Around 20 percent of the yield of stone fruit and grapes is also damaged by birds; moreover the total loss is increasing from one year to the next. Strawberry and blueberry fields and orchard crops suffer 15-40 percent damage by birds in different countries.*

Building nests on powerline supports and weaving pieces of wire into them, birds cause power outages and deprive various facilities of electric power; it costs the national economy hundreds of rubles to find the cause of a single power outage, while the consequences of such outages are much more expensive. Actively populating cities and industrial towns, rock doves, hooded crows and some other birds are becoming vectors of serious illnesses among people and agricultural animals--ornithoses. At fur farms, hooded crows and gulls eat feed intended for fur-bearing animals. In fish hatchery ponds, gulls, cormorants and other birds annihilate more than half of the young produced by valuable species of fish. Aircraft repair and assembly shops and the shops of agricultural machine building enterprises are inhabited by pigeons whose droppings get into exposed engines. Layers of droppings covering bridge supports, towers, industrial structures and the surfaces of vertical pipes cause their intensified corrosion and destruction due to microbiological processes swiftly developing on the metal surface. Historical monuments suffer throughout the world from bird droppings.

But there is another side to the problem. We cannot disregard the continually increasing role birds play as a natural ecological barrier preventing mass

*See Ilichev, V. D., "Upravleniye povedeniyem ptits" [Control of Bird Behavior], Moscow, Nauka, 1984.

outbreaks in the abundance of harmful insects. As an example within a month a flock of starlings can annihilate up to 100 tons of locusts, which continue to be a real scourge to the agriculture of African and Asian countries, and enormous assets are spent on its chemical control. Within a month and a half a colony of gulls (2,000 individuals) in southern Ukrainian oblasts can annihilate half a million dung beetles, as many corn weevils, 600,000 susliks and around 70,000 field mice.

And of course, we cannot forget the enormous cultural and even moral value of the esthetic emotions experienced by man as a result of constant cohabitation with birds.

Contrary to the protests of ecologists, businessmen in the USA and other capitalist countries practice mass annihilation of birds by strong-acting poisons. Millions of birds die, but their numbers recover quickly due to migration and the intensive reproduction stimulated by the population decrease.

At the same time many species of birds are presently in a catastrophic position. In 10,000 years mankind annihilated two-thirds of the forest habitats of birds, preserving an area of 4,060,000 hectares out of 14,800,000 hectares of habitat. Escalating environmental pollution is having a deleterious effect on the life of birds. Each year just tanker accidents accompanied by oil spills kill millions of birds. From the 16th century to the present 150 species and subspecies of birds have gone extinct, 40 of them disappearing just in the 20th century.

In our country 80 species of birds (1 out of 10 of USSR fauna) were entered into the "USSR Red Book" as rare and disappearing. They all require assistance from man.

The total number of domesticated birds maintained for agricultural and cultural purposes in industrial complexes, private farms, cages and aviaries in the world is apparently several tens of billions of individuals. Poultry farming now needs the help of ethologists. Artificial wildfowl breeding is playing an increasingly larger role, especially in connection with the appearance of nuclear power plant cooling ponds, which are a favorable habitat for enormous masses of waterfowl.

How can we optimize the relationship between man and birds in such a way as to make it mutually acceptable? The sole effective and ecologically advantageous way is to learn to control the behavior of birds, forcing them to move in the direction needed by man, to avoid economically important objects and concentrate where their assistance is needed in controlling harmful insects. This is precisely what Soviet scientists adopted as the principal ecological-ethological strategy, in distinction from their foreign associates, who have based their approaches on methods of elimination.

We selected acoustic signals simulating natural reference signals used by birds as the means of affecting bird behavior. The choice can be explained not only by the technical convenience of reproducing acoustic reference signals, but also by the exceptional significance of voice and sound to

bird communication and orientation in space. Disregarding man, who possesses speech, a unique communication tool, birds, with their diversity of acoustic signals, their capability for perceiving and locating low-intensity and noisy sound sources, and with their highly precise mimicking of their own voices and incidental sounds (and, incidentally, human speech), have no precedent in the animal world. This is why it was natural to use namely this channel of "communication" with birds in order to affect their behavior.

Experiments were conducted for a number of years with the purpose of comprehensively and integrally studying the acoustic and signaling behavior of birds, including the signals themselves and their use in ecological situations; research was also conducted on the sensory substrate receiving the signals and its function in different artificial and natural conditions and, finally, on reactions to simulated natural signals. The research produced interesting results which confirmed the unique nature of the signaling and orientational communication capacities of birds, and the fundamental possibility of their use as a means of directed influence upon behavior.

As a result bird signals, communication and orientation became an object of study. This trinity, which came to be called the "ecological information science of birds," was studied comprehensively and fully chiefly from the point of view of analogies with economic and ecological situations--in those "hot spots" where there was a special need for affecting behavior in a direction required by man. Research was conducted on the signaling and orientational structure of behavior and on information processes occurring in mass accumulations of birds.

The main object of influence of controlling stimuli was mass accumulations having primary economic significance. It was revealed that information processes occurring in them in response to a repellent signal differ from those occurring in small groups. The response of a single individual isolated from its partners in a group or accumulation was found to be different. At the same time the reaction of the same individual when it was within the composition of a mass accumulation and when it could communicate with its partners through numerous, diverse signals, depended on the overall communication background of the flock, and on phenomena such as presence of experienced individuals familiar with the action of the repellent, their group sensitivity to the repellent, their group memory and other group effects.

The following phenomena were revealed by research on the signaling behavior of birds in mass accumulations subjected to a repellent.*

The phenomenon of the go-between and secondary repellents: One or several of the most experienced and sensitive individuals (go-betweens), whose reactions serve as a signal (secondary repellent) for the rest of the members of the group, react initially to a repellent signal reproduced by a technical device.

*See Ilichev, V. D., Op. cit.

The phenomenon of cascade spreading of a repellent signal and self-excitation of the group: Owing to signals produced by go-betweens, more and more new individuals join in the reaction, and the group undergoes self-excitation under the influence of the signal's continuous circulation.

The phenomenon of group learning in relation to a repellent signal and group memory: A group always contains individuals that are more experienced, that are better acquainted with the action of a repellent owing to prior experience. Reacting to the repellent, by their behavior they teach "novices," which also become experienced, and later on perform the function of go-betweens; in this case sensitivity to the repellent is retained in the group memory owing to the reaction of experienced individuals.

The phenomenon of adaptive habituation to a repellent signal and renewed reinforcement: The group habituates itself to a repellent in the event that its action is not accompanied by ecologically active reinforcement; the habituation reaction is an adaptation, and it does not mean loss of sensitivity. The latter manifests itself with its previous intensity if reinforcement is renewed.

Studying the role of reference signals in the evoked behavior of mass accumulations of birds, we concluded that their effectiveness as a controlling stimulus depends not only on presence of signaling components within them but also on presence of an ecologically active factor of influence that is vitally important and well known from previous experience. In this case reinforcement adequate to the signal component plays the role of the ecologically active, vitally important factor. In some cases both of these factors--the signaling factor and the factor of influence--combine into a single reference signal which then becomes their common vehicle, while in others two different reference signals which are present simultaneously and which therefore have the necessary combined effect on birds serve as the vehicles.

Studying the traditional repellent of distress calls from this standpoint, we established that it simultaneously contains not only the signaling factor but also an active factor of influence--a stress factor which causes discomfort when it is perceived. On the other hand numerous, diverse alarm signals produced by birds in nature are found to be causally associated with reference signals that are of extreme danger to birds--with various predators for example. This provided the grounds for using these signals as repellents necessarily in combination with reference signals simulating danger. Simultaneous presence of two components--the signaling and the ecologically active one--in the controlling stimulus has enjoyed wide application in the structure of synthesized repellents.

Detailed study of the structure of reference signals having a high ethological effect (one affecting behavior) revealed that they have redundancy in relation to the signaling component and the active component of influence. We can ignore this redundancy, and limit ourselves to identification characteristics--the markers of these components. This important conclusion, and the conception of markers based on it, significantly simplify the work of reproducing reference signals to be used as a controlling stimulus, since

the need for their complete duplication disappears. Moreover markers open up the possibility for creating synthesized stimuli that are more effective and much easier to reproduce. This transition from copying a natural reference signal to synthesizing it on the basis of the highly active components revealed essentially represents a new stage in solving the problem of controlling bird behavior accompanied by creation of a new generation of stimulators.

In the USSR, the Institute of Evolutional Morphology and Ecology of Animals imeni A. N. Severtsov (IEMEZh) of the USSR Academy of Sciences has been developing, since 1973, technical devices that simulate bird voices and thus affect bird behavior. In 1976 V. E. Yakobi, an associate of the institute, created the first bioacoustic stimulator that frightens birds away from airfields.* The instrument was tested at the Tallinn airport, and it recommended itself well, reducing the number of collisions between airplanes and gulls. Its principle of operation was based on the laws of bird signaling and communication known at that time. In all other respects it was a typical representative of first-generator stimulators: It duplicated the voices of birds, and it was not accompanied by reinforcing components.

Further improvement of stimulators of this type led to creation of technical devices for frightening birds away from industrial plantations of stone fruits and from vineyards.** The device was based on broadcasting distress calls and simultaneously shining a moving light beam, which acted as the reinforcing (discomfort) factor. The device was tested successfully in production conditions, promoting preservation of around 1.5 tons of mazzard cherry per plantation hectare.

Work on resources for frightening birds away from airfields carried out by the IEMEZh, the Institute of Zoology and Parasitology of the Lithuanian SSR Academy of Sciences, Moscow University and other institutions in the country promoted creation of a highly effective acoustic device; experimental models of this device were developed and manufactured in the design office of the Institute of Civil Aviation Engineers (Riga) under the supervision of V. Ya. Biryukov.

Poultry farming and wildfowl breeding have recently become the most active new users of bioacoustic stimulators. Filling production orders, jointly with Moscow State University (A. V. Tikhonov) the IEMEZh (V. M. Gutsev, I. Yu. Shapiro) created several stimulators that successfully passed laboratory and semi-industrial tests (Figure 1).*** Up to 80,000 rubles profit were received for every million young birds at poultry factories where these

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*See Yakobi, V. E., "Biologicheskiye osnovy predotvrashcheniya stolknoveniy samoletov s ptitsami" [Biological Principles of Preventing Collisions Between Airplanes and Birds], Moscow, Nauka, 1974.

**See Dzhabbarov, A. B., "A Repellent Resource for Protecting Vineyards and Stone Fruit from Damage by Birds," in "Zashchita materialov i tekhnicheskikh ustroystv ot ptits" [Protection of Materials and Technical Devices from Birds], Moscow, Nauka, 1984.

***See Ilichev, V. D., Tikhonov, A. V. and Gutsev, V. M., "Bioakusticheskaya stimulyatsiya ptits" [Bioacoustic Stimulation of Birds], Moscow, IEMEZh, 1984

instruments were tested. Concurrently manual labor was reduced, and individual elements of the process of incubating and rearing the chicks were optimized.

Detailed study of reference signal mutual relationships in groups of agricultural birds made it possible to reveal ways of ethological influence on their productivity and reproduction. When he moved birds into the enormous shops of industrial poultry factories, man concerned himself with their ecological comfort, but he failed to account for the ethological aspects of their maintenance. Birds need to be in the presence of a quite definite set of reference signals which create a specific reference signal environment (Figure 2).

While still in its egg, a chick exchanges special signals with the brood-hen that is its mother, and the latter "guides" the hatching stage, so important to the chick's life, and subsequent actions. While still in the egg the chick memorizes the voice of the brood-hen, and later on this is precisely what serves as a dependable reference point with the help of which the chick learns to react adequately together with the rest of the brood to all possible life situations--appearance of an enemy, changes in weather and so on. In this case special signals of the brood-hen directed at the brood stimulate the feeding activity of the chicks and promote their faster development.

Prior to hatching, chicks establish mutual relationships by signaling to each other with so-called "clicking sounds," the rhythm of which depends on breathing rhythm. All chicks tune themselves to the voice of the embryo that clicks (and consequently breathes) the fastest. Thus each embryo breathes more frequently and grows faster in response to the action of the clicking sounds of its neighbors. Owing to the stimulatory action of the clicking sounds and communication of the embryos between each other, an important effect is achieved--acceleration of development and synchronization of hatching.

Thus there are grounds for considering a new direction that is extremely promising in scientific and practical respects, one associated with creating and developing technical devices simulating the acoustic signals of birds or their identifying characteristics--markers--which purposefully affect bird behavior.

Technical devices of a new generation are now being created, based on synthesis of markers revealed in the course of research on reference signals in nature.

Soviet scientists occupy priority positions in the area of control over bird behavior. The fastest possible realization of present and future developments will require efficient interaction between academy and sector institutes, VUZ departments, specialized design offices and manufacturing plants, interaction which is confirmed by contracts and by an overall introduction plan.

FIGURE CAPTIONS

Figure 1. Outside View of a Bioacoustic Stimulator

Figure 2. Behavior of Chicks Grown in the Presence of Bioacoustic Stimulation at the Kurskaya Poultry Factory: above--before exposure to sound simulating the "calling" components of natural signals; below--after exposure

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METHOD OF CALCULATING THERMAL BALANCE OF PERSON IN DRIVER'S CABIN

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(manuscript received 4 Mar 85) pp 49-50

[Article by M. V. Mikhaylov, Scientific-Production Association of the All-Union Scientific Research Institute of Agricultural Machine Building, Moscow]

[Abstract] A refined method is suggested for calculating the radiation balance of a body through a window in contact with the atmosphere. Representing the solar or directed infrared radiation received by the body as Q in watts, equations are developed to determine the flux of radiation as a result of heat exchange between the body and the surfaces of the interior of the cabin. This is done by dividing the cabin surface into a number of sectors differing in temperature or properties with respect to infrared radiation. The method allows determination of the components of the radiation balance of the human body under various conditions. It considers numerous factors characteristic for small cabins, including the presence of solar radiation directly striking the human body, nonuniformity of temperature and properties of individual sections of the cabin surface and air speed. It allows consideration of the absorbing, reflective and transmissive properties of the clothing and skin, uncovered skin area, energy expenditure by the body and other factors which actually influence the human radiation balance. Figure 1; references 15: 14 Russian, 1 Western.

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PROTECTIVE PROPERTIES OF "LEPESTOK-G" RESPIRATOR FOR MERCURY-203 VAPOR

Moscow GIGIYENA I SANITARIYA In Russian No 2, Feb 86
(manuscript received 20 Jul 85) pp 51-53

[Article by L. S. Yeskova, V. A. Cherednichenko, A. S. Korostin, V. Ya. Samsonov and B. L. Raginskiy]

[Abstract] The purpose of this work was to evaluate the protective properties of the "Lepestok-G" respirator in studies with human volunteers performing physical work. This respirator is designed to protect an individual from mercury contamination during exposure to Hg vapor. The volunteers wore plastic suits to prevent skin absorption of mercury vapor, with pure air at 100 l/min pumped through the suits. A constant concentration of mercury vapor labeled with ^{203}Hg was maintained by a generator consisting of an amalgamated brass or copper screen in a closed metal container, onto which liquid mercury was poured while the air temperature in the generator was maintained at 40-45°C. The penetration coefficient through the respirator was found to be 0.05%, based on the results of 14 experiments. Total penetration including penetration through the filter, leakage and all other sources averaged 1.5% and did not exceed 2.6% during the course of 100-minute experiments, indicating that the respirator can be used with mercury vapor concentrations up to 40 times the maximum permissible concentration. References 5 (Russian).

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ENCYCLOPEDIC DICTIONARY OF MEDICAL TERMS (EDMT) MOSCOW, 1984, PP 512, CIRCULATION 100,000

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian No 2, Mar-Apr 86, pp 74-75

[Reviewed by V. A. Gologorskiy and P. V. Smolnikov, Moscow]

[Abstract] This is a review of the titled dictionary, the third volume of "Sovetskaya Entsyklopediya, the third and final volume of EDMT appeared in 1984 and covers the letters R through Ya. In addition to the standard material treated in earlier volumes, the third volume contains also an index of eponymic terms, International Units system and Greek-Latin dictionary of the elements of terminology. In addition, this volume contains a historical overview of the systematization of medical terminology by Professor M. N. Chernyavskiy which is abstracted in greater detail. The reviewers found no weaknesses in this book except for the somewhat limited circulation.

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